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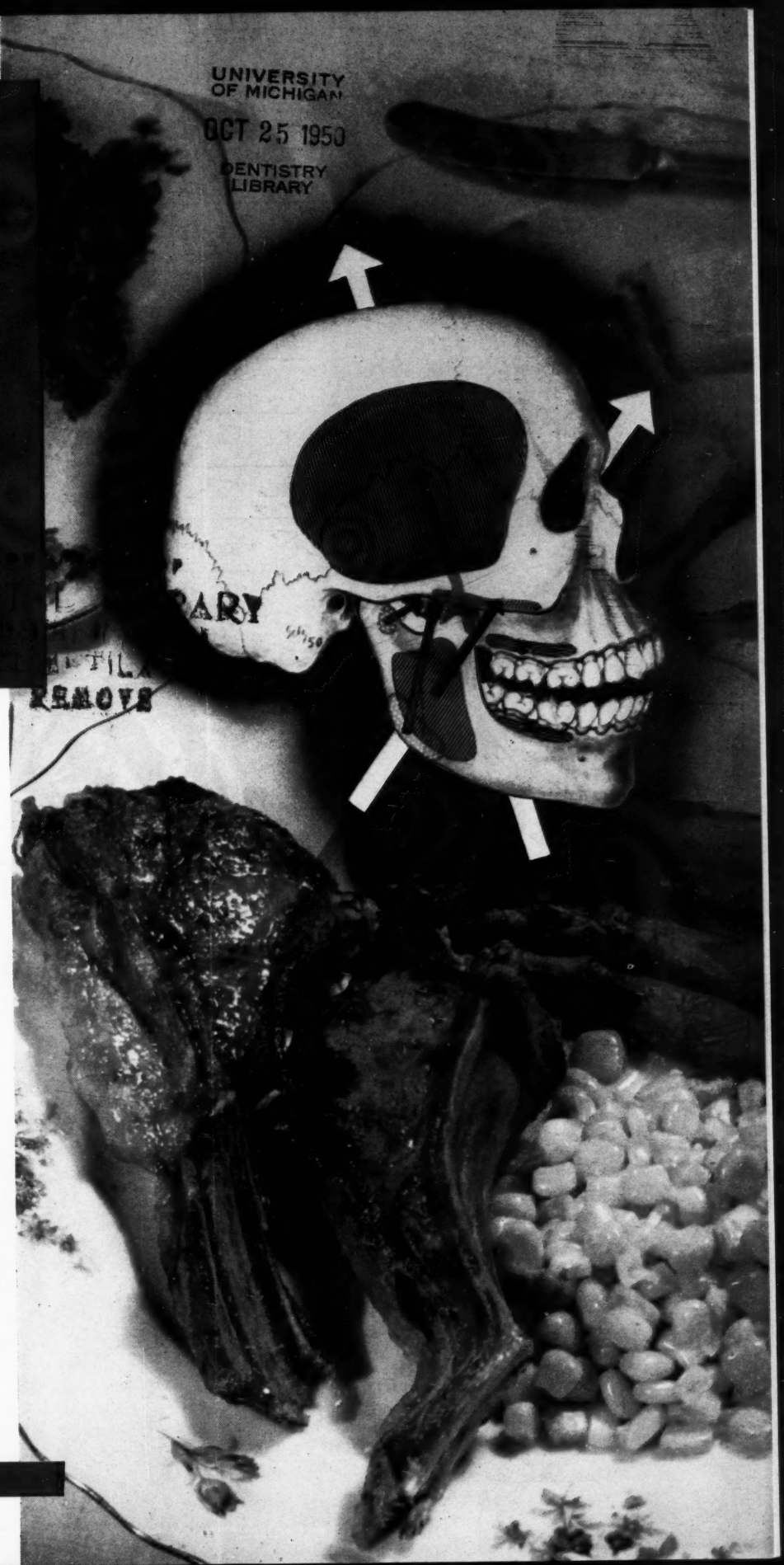

October 1950

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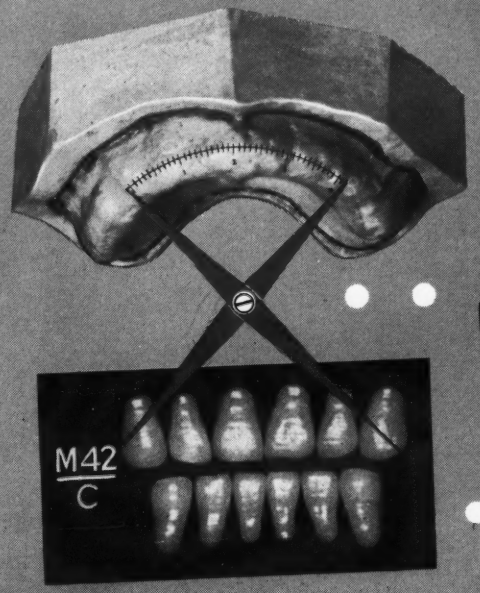

42 M

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LONG L	L36 C	L39 C L39 F		L42 C L42 F		L45 C L45 F		L48 C L48 F	L51 C
MEDIUM M	M36 C	M39 C M39 F	M40 C M40 F	M42 C M42 F	M43 C M43 F	M45 C M45 F	M46 C M46 F	M48 C M48 F	M51 C
SHORT S		S39 C S39 F	S40 C S40 F	S42 C S42 F	S43 C S43 F	S45 C S45 F	S46 C S46 F	S48 C S48 F	

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Vol. 56 No. 10

Dental Digest

OCTOBER 1950

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JOSEPH E. SCHAEFER, M.D., D.D.S., and RALPH C. RUDDER, M.D., D.D.S., are oral surgeons and are known to DIGEST readers for their recent series of articles describing operative procedures in cases encountered in their personal practice. This month, in JUVENILE FRACTURES OF THE JAWS, Doctor Schaefer and Doctor Rudder present five case reports in three of which plaster head bandages were substituted for the commonly used intramaxillary wiring technique.

HANS ELIAS, Ph. D. (University of Giessen, Germany, 1931) has been a teacher of microanatomy, visual education, and general education in Germany, Italy, and the United States. At present Doctor Elias is engaged in research and teaching at the Chicago Medical School, Department of Anatomy. The material for HISTOLOGY AND DYNAMICS OF CAPILLARIES AND ARTERIES, to be presented in four parts, was originally created for an educational film strip.

LESTER HOLLANDER, M.D. (University of Pittsburgh, 1912) and STANTON M. HARDY, A.B. (Princeton University, 1928), M.D. (Johns Hopkins University, 1932) are engaged in clinical research and both have published extensively. They have collaborated in the preparation of an article in the current issue, AUREOMYCIN IN THE TREATMENT OF INFECTION OF THE MOUTH.

VICTOR STOLL, D.D.S. (New York University, College of Dentistry, 1917) studied for a career in engineering in Switzerland and Germany. During his thirty-three years' practice of dentistry Doctor Stoll has continued research in the dynamics of occlusion and the development of precision instruments for the diagnosis and treatment of dental abnormalities. Doctor Stoll's article in the current issue, THE IMPORTANCE OF CORRECT JAW RELATIONS IN CERVICO-ORO-FACIAL ORTHOPEDIA, is adapted from material first published in *Dental Concepts*.

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BALANCE *and* EQUALIZATION *of Stresses in Dentures Accomplished by Means of Prescribed Interferences*

A. W. WARD, D.D.S., San Francisco

DIGEST

This new technique for the construction and rebasing of partial and complete dentures is the outgrowth of the author's investigations in occlusion and harmonization of natural teeth[1] and the use, at that time, of an original surgical pack (wondrpak)[2] formulated for protection of wounds incident to periodontal pocket eradication. This pack was the first zinc oxide-resin-eugenol cement used in prosthodontics. It was first used as a lining for immediate dentures, then as an impression material, then for bites and bite blocks. Its use initiated many of the modern prosthetic techniques, using zinc oxide-resin-eugenol cement, so popular today.

The technique described applies (1) to used as well as new dentures, and (2) to mandibular or maxillary partial or complete dentures. In the present article the mandibular complete denture is given special attention but the principles apply to the upper denture and, modified, can be successfully adapted to impression taking.

Former Methods of Denture Construction Arbitrary

Experience and conferences with prosthodontists reveal no contraindications why a method of harmonizing the pressures and adaptation between the tissue and the denture base should not be adopted, especially as the inadequacy of former techniques and combination of methods has been thoroughly demonstrated.

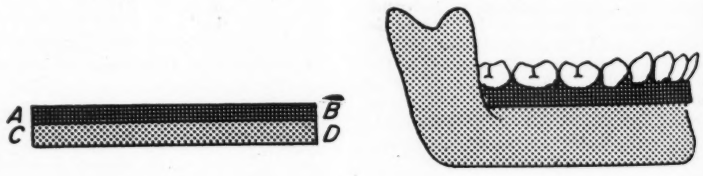
Former complete denture construction methods have been arbitrary. The construction has been achieved entirely outside of the mouth without effort at adjustment of the tissue base to the occlusion. Adjustment has largely consisted in attempts at correction of occlusion.

Directional Forces Disregarded—1. Previous rebasing methods have been confined to forcing bases, filled with plastic material, to position without regard to directional forces established by unequal muscle stress and inclined planes of occlusal surfaces.

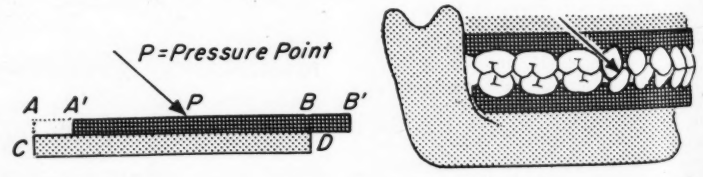
2. Irregularities or maladjustments inherent in the denture before attempts at correction were exaggerated.

Equalization of Pressure—Attempts to equalize pressure by means of central bearing points are not successful because the culmination of the pressure exerted at the bearing point is distributed evenly over the tissue-bearing area without regard for the intermittent variable pressure exerted in occlusion which, transmitted vertically and horizontally through the denture, influences its reaction on the tissue base.

Overstress Persists with the Use of Slow Setting Materials—Correction



1A. ***Two horizontal frictionless plane surfaces in contact. The mandible represents the denture at rest as on plaster model, articulator, or mandible. Bodies at rest tend to remain at rest Bodies in motion tend to remain in motion with uniform velocity in a straight line.***



1B. ***Illustrates the tendency of the denture to migrate anteriorally if inclined planes exert influence in that direction. Inclined planes of occluded teeth may exert influence in any direction, depending on the abruptness of the angle and the set of teeth of which they are a part in addition to directional stress of the masticating muscles.***

[1]Ward, A. W.: Inharmonious Cusp Relation as a Factor in Periodontoclasia, J.A.D.A. **10**:471-481 (June) 1923.

[2]The zinc oxide-resin-eugenol cement now used is prospak, an improvement on the original wondrpak.

cannot be made by the use of slow setting or plastic materials designed to be worn for one or several days in the belief that the material, given opportunity, will equalize the stresses by conforming to the inequalities. All that is accomplished is (1) stretch of the movable tissue, and (2) duplication of tissue surface under the most unfavorable condition, pressure.

Results of Repeated Application of Plastic Materials—Plastic materials repeatedly used to stabilize or tighten a denture (1) increase vertical dimension, (2) decrease size, and (3) bring undue pressure throughout. This results in inflammatory changes including stasis, hypertrophy, and atrophy.

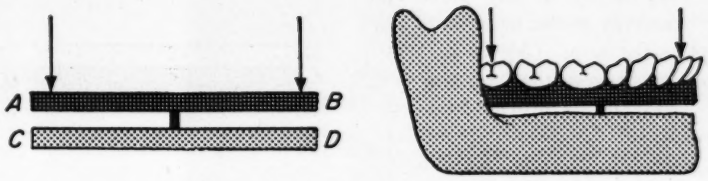
New Procedure Based on the Laws of Inertia and the Lever

That former rebasing methods are fundamentally unscientific is proved by comparison with the new technique which is based on the laws of inertia and the lever. These laws should be the scientific basis for full denture construction.

The described technique involves a combination of two principles: (A) the culmination of the reaction of the application of stress by the masticatory musculature, and (B) the effect and direction of stress influenced by the inclined planes of the tooth cusps, or other opposing surfaces, on the relation of the denture to the soft tissue base at rest and in function.

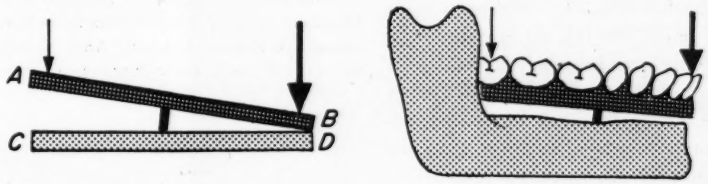
Impression Taken of Tissue When not Subject to Pressure—The success of this technique in prosthetic dentistry is partly based on the fact that the final step in the procedure is that of securing an impression of the tissues under the denture base (1) without subjecting the tissues to pressure, and (2) by the utilization of this facsimile in the construction of the denture rather than a facsimile of a model made from the original impression which was taken without regard for the unequalized pressures that occur in mastication.

The Use of Stops—The denture base which becomes the receptacle for the impression material for the final



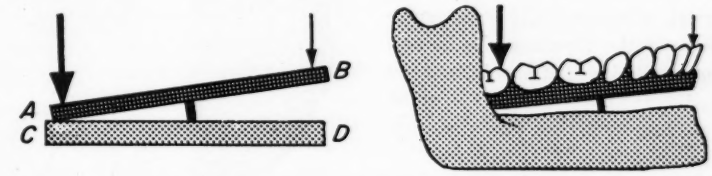
2. ***A bar supported on a fulcrum at its center with equal forces or weights applied at each end. The bar is in neutral equilibrium and the upper vertical reaction at the fulcrum is equal to the sum of the forces at A and B.***

The mandible supporting the denture rests on a fulcrum. This drawing illustrates the principle on which this technique is based.



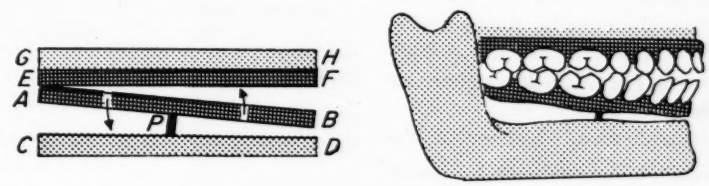
3A. ***If the force at B is greater than at A or if the fulcrum was moved to the left of the center of the bar, the lever would no longer be in equilibrium and would rotate clockwise about the fulcrum assuming the position shown.***

The mandible and denture demonstrate the operation of the principle when applied to dentistry. If a force is greater anterior to the fulcrum the posterior portion of the denture will tend to elevate, but all the pressure will be on the fulcrum which, resting on a soft base, tends to sink into the tissue. This immediately prevents horizontal migration anteroposteriorally, but permitting elevation or depression, accomplishes equalization.



3B. ***If the force at A was increased sufficiently to exceed the force applied at B, the lever would assume the position shown.***

The mandible and denture represent the reverse action of Figure 3A. This is the usual occlusal situation. The biting stress initially is in the second molar region. The anterior teeth elevate because of the fulcrum and posterior pressure. The elevation is checked by engagement with teeth on the maxilla or mandible as the case may be.



4. ***A-B is a prismatic bar supported on a fulcrum at P with end A in contact with a fixed horizontal surface E-F. As the lower plane C-D is moved vertically upward the bar A-B may be in contact with E-F continuously, momentarily, or alternately, depending on the rate of rise of lower plane C-D and the location of the fulcrum in relation to the center of gravity of A-B.***

The mandible with denture illustrates the changes taking place under the denture in the process of equalization as the mandible travels upward toward the maxilla. The pressure may be initially greater posterior or anterior to the fulcrum but cannot remain so provided there are opposing stable teeth or unless sufficient space does not exist to allow for the initial pressure.

impression is not at any point in close proximity to the tissue initially except at the stops. (A) To prevent apposition between the base and the tissue, and (B) to provide bilateral fulcrums, suitably formed pieces of wax, referred to as stops, are secured to the inner surface of the base at points approximately the center of gravity.

If initially there is contact between the base and the tissue exactly at the stops during the final step the aim will be defeated. The stops must be in high relief, the full thickness of wax above the denture base surface.

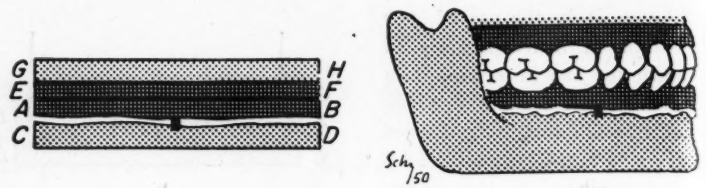
Purpose of the Stops—1. The stops serve (1) to prevent horizontal migration of the denture or base on the tissue, and (2) to act as fulcrums, permitting elevation or depression of the base according to the lines and degree of force exerted during closure. Allowance is made for vertical movement, but horizontal movement is checked.

Quick Setting Material Used—The space between denture and tissue is filled with a quick setting zinc oxide-resin-eugenol cement (prospak). The material, when set, will be a reproduction of the tissues and will represent a definite relationship between occlusion and tissue adaptation which has not been established by any other means heretofore.

Force Concentrated at the Stops—A study of the schematic drawings shows the possibility of equalizing pressure between base and tissue with negative pressure over all the bearing surface, except at the stops where the force is concentrated. Trimming the stops before laboratory processing equalizes the pressure throughout.

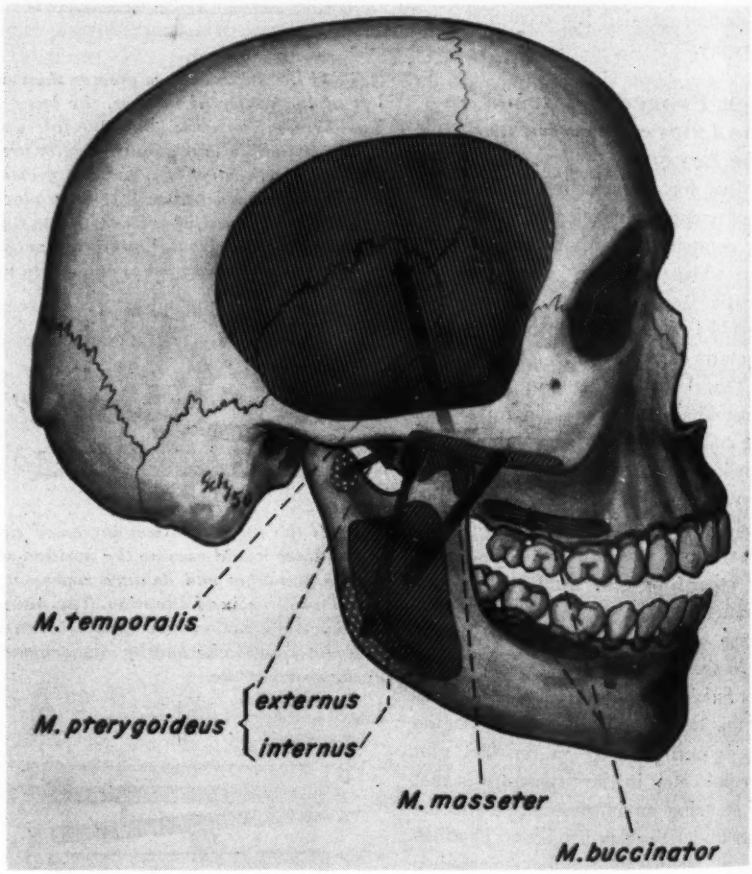
Theory for Equalization of Pressure

1. If a denture is balanced on the



5. ***The lower plane C-D has moved to the upper limit of its vertical motion and the entire length of A-B is in contact with the fixed surface E-F. The intensity of pressure of A-B, on the fixed surface E-F, varies according to the relative position of the fulcrum. If the fulcrum is located midway between A-B the pressure is uniform. Otherwise the pressure will vary from a maximum at the end nearest the fulcrum to a minimum at the other end.***

The space between A-B and C-D is filled with a soft plastic material. There is a displacement of excess plastic material as the plane C-D moves vertically as shown in Figure 4, to the final position of Figure 5. When plastic material between A-B and C-D has hardened, pressure under A-B can be said to be equalized.



6. ***Schematic drawing demonstrating the directional pull of the various muscles of mastication. They are all concerned in closure and mastication. The external pterygoid moves the mandible forward in the first closure movement, later assists in upward movement. The internal pterygoid raises the mandible. Singly, they pull the jaw to the opposite side. The temporal inserted on the coronoid process and the masseter attached to the ramus and body of the mandible, at the angle, act in unison with the pterygoids to perform the act of mastication. The impulses are delivered by the masticator nerve fibers.***

Although there is accord and synchronization in the act of mastication, there are varying degrees of pressure on segments of the occluding surfaces of the teeth, depending upon comparative strength of the muscles and cuspal plane inclinations. This variance of pressure results in unequal pressure between tissue and denture base and this may result in movement of the base along the line of least resistance or excessive pressure and consequent soreness.

ridge by the projections from the denture, each equidistant from the median line, a pressure applied vertically will tend (1) to depress the denture posterior or anterior to the fulcrum, and (2) to elevate the denture immediately beyond the fulcrum.

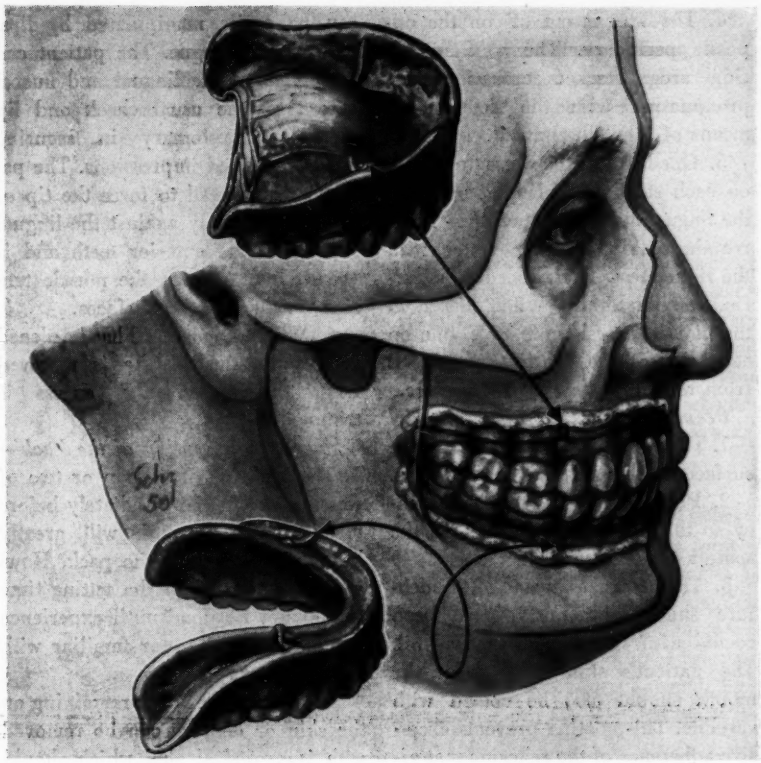
2. The resistance met by the ascending surface by contact with the natural teeth or occluding surfaces of the opposite denture tends to depress or halt the upward movement. Depression will occur if force is greater at this point than at the original contact.

3. There will be successive elevation and depression anterior and posterior to the fulcrum until the space under the denture has been expanded on one side of the fulcrum and diminished on the other to accomodate the unequally applied stress.

4. The anteroposterior or horizontal movement caused by cusp inclination will be controlled by the embedding of the stops into the tissue during the hardening period of the prosthetic cement.

Position of the Stops—Stops are placed on the ridge area as near as possible to the center of bearing surface or center of gravity. The center of gravity should not be considered necessarily as the balancing point of the denture out of the mouth because weight of the denture anterior or posterior to the fulcrum is not a factor when biting stress is applied.

Practical Application of the Theory—Careful attention to explanation of the procedure and care in following the steps described will repay the operator (1) in successful results, (2) in improved service to the patient, and (3) in saving of time in adjustment.



7. ***This drawing demonstrates the finish of the technique, except that the excess prospak has not been molded by the lips and cheeks. An excess of material is necessary to give wider peripheral borders, but cheek, lip and tongue manipulation is necessary to prevent overextension. In the mandibular anterior lingual region care must be exercised to secure sufficient width and depth.***

This illustration also shows the position of the stops or fulcrums, indicated by the arrows. They should be opposite each other, two for each denture. A center of gravity is the aim.

Procedure

1. Construct the case in the manner of choice. If the maxillary denture is satisfactory and the mandibular is not, check the lower for the following points: (1) maximum coverage distally, (2) the post molar pads, (3) extreme extension lingually, and (4) lingual arc anteriorally.

If deficient in any of these areas, add compound and muscle trim. These instructions apply to new or old dentures.

2. Remove the peripheral rim in all other areas to the degree that the denture has no tendency to raise when seated. Check vertical height. If correct or too great, cut away all inner surface to compensate for thickness of stops. With stops in place the vertical dimension should be correct. The sole contacting points are the stops touching the tissue under the denture and the occluding teeth.

3. The aim should be (1) maximum coverage without impeding upon movable tissues, and (2) reproduction of soft tissue base surface secured without pressure.

4. This reproduction is secured by means of prospak.

5. When the denture has been trimmed to overcome peripheral interferences and occlusion is deemed satisfactory, the stops are secured to the denture base. The stops vary in length, depending on the width of the ridge. The width of a stop is approximately 3 millimeters and 1 millimeter in thickness, that of ordinary baseplate wax.

Forming the Stops—1. A sheet of baseplate wax is slightly warmed to prevent cracking in cutting.

2. With straight scissors a strip of the baseplate wax is cut across the width of the sheet.

3. The end of the stop is molded into the tissue-bearing surface of the denture just posterior to the first bicuspid area. The end of the wax inside the denture, near the periphery, is tacked down with a hot instrument.

4. The wax is cut off on the opposite periphery. The wax on the ridge area is tacked across its entire proximation with the denture by means of a hot instrument.

5. One-third of the wax is removed on each side of the ridge surface at the lingual and buccal periphery. The remaining third comes in contact with the ridge crest. This procedure is carried out bilaterally. When placed in the mouth these lateral stops, one on each side of the denture, prevent it from touching the tissue anywhere.

Preparation of Rebasing Material—1. There is space under the denture surface the thickness of the wax stops.

2. Prospak is mixed to a consistency so that it will barely flow off the spatula when turned edgewise.

3. The external surface of the denture should previously have been coated with vaseline or mineral oil. The patient's skin area about the mouth should also be coated with vaseline. This coating prevents excessive adherence of the rebasing material to the external surfaces.

4. The denture, overfilled with prospak, is positioned on the ridge and the patient is instructed to close.

Cooperation of the Patient—1. At this time the patient should be in centric. When the stops are forced against the tissue, the patient is immediately instructed to retain the firm position and assured that discomfort will not increase.

2. The prospak that has flowed out from under the denture should be tested from time to time to determine when it has become firm enough to manipulate.

3. At a critical period the prospak can be easily manipulated by lips, cheeks, and tongue. The patient can readily mold the lingual and buccal excess by the usual cheek and lip movement customary in securing muscle-trimmed impressions. The patient is instructed to force the tip of the tongue firmly against the lingual surface of the anterior teeth and is warned not to relax the muscle tension on the occlusal surfaces.

4. When the material has hardened sufficiently, the denture is removed from the mouth and excess is trimmed.

Accelerating Setting of the Pack—1. The addition of a drop or two of water to the mass immediately before placing in the mouth will greatly hasten hardening of the pack. However, speeding up of the setting time should not be done until experience has made the operator familiar with the technique.

2. Thin films of pack remaining on the skin or denture can be removed with isopropyl alcohol which should be allowed to saturate the surplus for a minute or two to lessen adhesion.

Final Steps—1. After removal of the surplus pack from the external denture surface the wax stops are reduced with a suitable instrument by scraping until they are level with the surrounding pack.

2. The denture can now be replaced in the mouth and tested. If satisfactory, the case is ready for laboratory processing, or the patient may be allowed to wear the case, with prospak lining, for a period of one day to a week or more, until the operator is assured that satisfactory results have been achieved.

3. When familiar with the method, at the final try-in the baseplate may be used rather than the processed denture.

Result

Properly executed, the result should be a stable denture possessing the following qualities: 1. Equalized pressure. 2. Duplication of the maximum tissue-bearing surface secured without pressure but embracing the influence of the lines of force indicated by the muscles of mastication in function.

Summary

1. By means of (1) bilateral stops, and (2) a prosthetic cement, horizontal and vertical stresses can be equalized to overcome the tendency of dentures to migrate on their bases when masticating stress is applied.

2. The practical application of the theory described makes it possible to overcome the inherent defect in former denture construction techniques; namely, shift or migration of dentures on their tissue bases due to unequalized pressures during mastication.

3. In addition to equalization or control of divergent stresses, not heretofore taken into consideration, other factors necessary for the production of satisfactory dentures have been fulfilled.

4. The addition of the new procedure to satisfactory techniques now being used brings prosthodontics nearer to perfection.

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JUVENILE FRACTURES

of the Jaw

JOSEPH E. SCHAEFER, M.D., D.D.S.,
and RALPH C. RUDDER, M.D., D.D.S., Chicago

DIGEST

The statement has been made that 90 per cent of the fractures of the mandible, with the presence of teeth, can be corrected by intramaxillary wiring. While this percentage may seem high, the great majority of these fractures can be managed in this way. Five case reports of juvenile fractures in three of which plaster head bandages were substituted for the intramaxillary wiring technique are presented.

An Indication for External Pin Fixation

When teeth are present, fractures of the mandbile can be properly reduced and fixed by "Ivy loops" of size twenty-three stainless steel wire. External pin fixation, however, is limited.

One indication for external fixation is a situation where the fracture line lies back of the last molar tooth, often occurring with an upward displacement of the ramus. This displacement is frequently due to the powerful pull of the temporal muscle. The methods advocated for the correction of this type of fracture prior to the introduction of external pin fixation were not entirely satisfactory.

Exceptions—There are two chief exceptions to the intramaxillary wire fixation of fractures of the mandible: (1) Fractures occurring in an edentulous mandible, and (2) juvenile fractures.

Reasons for Exceptions—1. The juvenile fractures are an exception to the method of intramaxillary wire fixation because the deciduous teeth do not always lend sufficient support for maintaining the fractured mandible in position by intramaxillary wiring.

2. In fractures of the condyle area the prognosis depends upon whether they are intracapsular or extracapsular.

Anatomic Characteristics

1. The temporomandibular joint is freely movable. The articulating bone surfaces of the head of the condyle and the glenoid fossa of the temporal bone are held in functional relationship to each other by a capsular ligament which completely surrounds the socket.

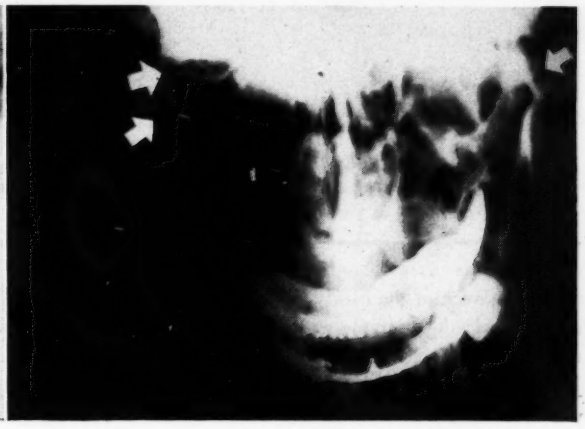
2. Within the socket is an intra-articular disc of fibrocartilage dividing the joint cavity into an upper and lower compartment.

3. Most fractures of the neck of the condyle occur below the attachment of the capsular ligament; hence the danger of ankylosis within the joint cavity is a remote possibility.

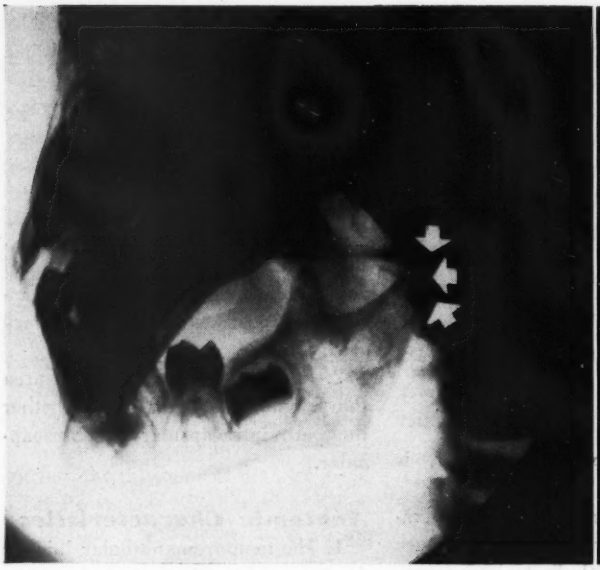
Correction of Prognathism

The angulation that can exist be-

1. *Roentgenogram showing bilateral fractures of necks of condyles.*



2. *Roentgenogram showing repair of condyles in abnormal position with considerable overlapping. Note that the patient also has acquired dentures.*



3. *Case 1. Child, age 2. Note what appears to be an intracapsular fracture of the head of the condyle. Immobilization for three weeks was carried out to limit callus formation and to bring the teeth back into occlusion.*

4. *Case 1. Photograph taken the day the plaster head bandage was removed.*

5. *Case 2. Child, age 3 (a recurrent fracture). Fracture of neck of condyle. Photograph of child with plaster bandage, holding jaw into occlusion.*

6. *Roentgenogram showing site of fracture.*

tween the neck of the condyle and the ramus, and yet terminate with a bony union and satisfactory motion of the joint (Figs. 1 and 2) is notable. Because of the possibility of angulation the technique for the correction of prognathism by severing the necks of the condyle was adopted.

Procedure—1. The necks of the condyles are cut and the body of the mandible is forced backwards so that the lower teeth articulate posteriorly to the upper teeth.

2. The necks of the condyles are fractured surgically.

3. In forcing the mandible backward, the necks of the condyle are displaced outwardly so that they overlap considerably (Fig. 2).

Surgical Interference Rarely Necessary—1. The teeth are wired into occlusion for three weeks so that the best relationship of the fractured ends of the condyles is obtained

without surgical interference.

2. Rarely is it necessary to interfere surgically, and then only in the case where the condyle is completely displaced from the socket and laid in the substance of the internal pterygoid muscle, necessitating removal of the head of the condyle.

3. Attempts at direct wiring of a fractured neck of the condyle have been observed to terminate with a facial paralysis.

4. It should be of value to the general practitioner to know that fractures of the necks of the condyles can be treated by intramaxillary wiring when they are extracapsular.

Case Reports

Five recent cases of jaw fractures in children whose ages ranged from two to eight years are reported: 1. Three cases were fractures of the condyle area. 2. One was a fracture through the body of the mandible. 3. One was a depressed fracture of the malar bone.

Case 1—A child, age 2, fell from a corn-crib; the distance of the fall was not ascertained. The child was referred because of what appeared to be an intracapsular fracture of the head of the condyle (Fig. 3).

Treatment—Immobilization for three weeks was decided on for two reasons: (1) To limit the callus formation within the joint during the period of repair by complete immobilization, and (2) to bring the teeth back into occlusion.

It is the authors' opinion that this type of injury, if neglected, leads to a subsequent ankylosis of the temporomandibular joint. The method of fixation consisted of a plaster head bandage (Fig. 4).

Risks Assumed—In a child so young there were certain risks involved in using this method, one of which was the danger of strangulation from vomitus. The child was kept in the pediatric ward until its feeding habits could be readjusted and it was certain that he was not subject to regurgitation. After a few days in the hospital the child was permitted to go home under the care of his parents with the instruction that if there was any difficulty the plaster bandage was to be cut immediately, and removed.

7. ***Case 3. Child, age 4. Fracture of head of condyle with open-bite malocclusion. Note marked deviation of jaw open to the right.***

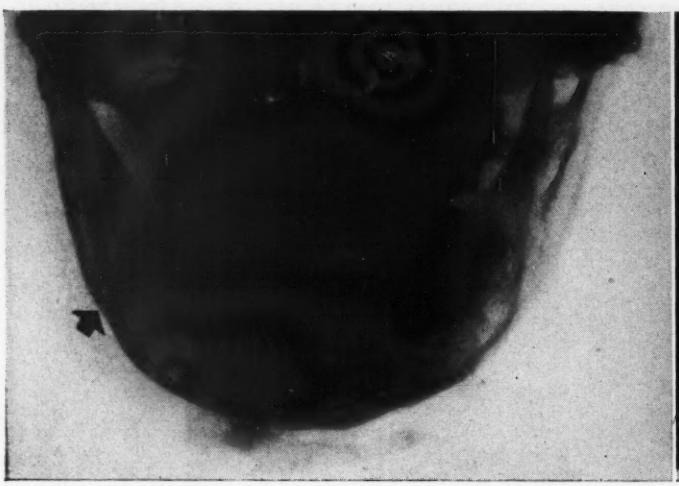
8. ***Open-bite malocclusion corrected by elastic traction.***

9. ***Case 3. Note shortening of ramus and loss of condyle outline.***

Case 2 (*same patient as Case 1*)—The child, age 3, fell from a second story window, again fracturing the neck of one of the condyles. The case was handled in the same way, by holding the jaw in occlusion. This time the problem of regurgitation was not so important because the child was older (Figs. 5 and 6).

Case 3—A girl, age 4, presented with (1) a fracture of the head of the condyle, and (2) an open-bite malocclusion (Fig. 7). In this case orthodontic methods were employed because the child was older and correction of the open-bite malocclusion was necessary (Figs. 8 and 9).

Case 4—A ten-year-old boy was first seen with an incomplete fracture through the body of the mandible. There were not sufficient permanent teeth for intramaxillary wiring. A



10. *Case 4. Roentgenogram showing incomplete fracture through body of mandible.*

11. *Case 4. Photograph showing plaster bandage. Limited intraoral wiring was also used.*

plaster head bandage with limited intraoral wiring was used (Figs. 11 and 12).

Case 5—A boy ten years of age was referred because of (1) a depressed fracture of the right malar bone, (2) anesthesia of the intraorbital nerve distribution, and (3) facial asymmetry (Fig. 13).

Description: 1. The maxillary sinus may be compared to a box within the maxilla. 2. The walls of the box are (1) the facial surface, (2) the zygomatic surface, (3) the nasal, and (4) the orbital surfaces. 3. Anatomically, the sinus is pyramidal in shape with its base toward the nasal surface and the apex within the malar bone; in other words, the malar bone enters into the walls of the box on the orbital, zygomatic, and facial surfaces.

Mechanism: 1. If a sufficient amount of force is applied to the side of the face, the walls of the box are forced into the sinus cavity. 2. A depressed fracture of the malar bone presents its fracture lines along its surface of articulation which are (1) the frontal process, (2) orbital and maxillary borders entering into the floor of the orbit, and (3) the articulation with the maxilla above the first molar tooth, and with the zygomatic process of the temporal bone (Figs. 13, 14, and 15).

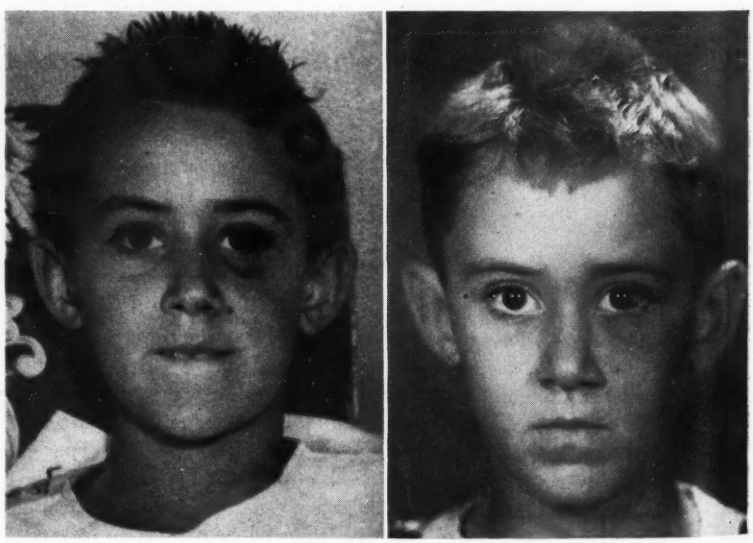
Symptoms: Objectively, the symptoms are (1) asymmetry of the face, and (2) a break in the continuity of the lower rim of the orbit. If this carries with it part of the floor of the orbit the subjective symptoms of double vision, and of anesthesia of the area supplied by the infraorital nerve are present.

Surgical Correction

The direct approach through the maxillary sinus in lifting the malar bone back to its normal position is preferred (Fig. 14). The procedure is simple and positive in its results:

1. An incision is made in the buccal sulcus, and the mucoperiosteum is stripped off the facial surface of the maxilla, sufficient to expose the line of fracture.

2. When the line of fracture is exposed an opening is usually found

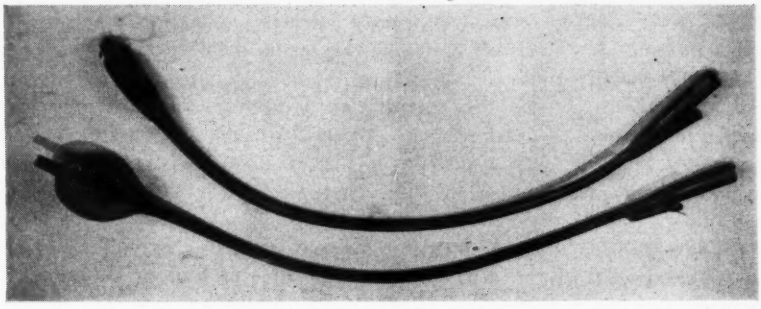


12. *Case 5. Photograph showing depressed malar bone on left side of face. Only stereoscopic photographs give real impression of the asymmetry.*

13. *Case 5. Photograph after elevation of malar bone back to its normal position.*

14. *Case 5. Roentgenograms showing depressed fracture of malar bone. Note clouding of antrum.*

15. *Case 5. Catheter in situ.*



16. *Case 5. Foley catheters; one inflated.*

directly into the sinus.

3. A uterine sound of the right size (Fig. 15) is introduced into the sinus and carried beneath the depressed malar bone.

4. The bone is then pried outward to place. The correct position is determined by palpation.

5. To hold the bone into position, and this is necessary if it is comminuted, a Foley catheter is introduced and the balloon attachment is inflated.

25 *East Washington Street.*
804 *West 79th Street.*

Anesthesia in Prolonged Dental Cases *

HARRY M. SLATER, M.D., and
C. R. STEPHEN, M.D., Montreal, Canada

Two techniques for dental anesthesia in children have been evolved by members of the Department of Anesthesia at the Children's Memorial Hospital, Montreal:

1. The use of trichlorethylene in combination with nitrous oxide and oxygen for dental extractions.

2. The use of sodium pentothal, curare and nitrous oxide for dental restorations and extractions.

Trichlorethylene has been used in 400 cases for procedures both in the dentist's office and in the dental clinic. These cases have lasted from a few to forty-five minutes.

Properties

1. The formula of trichlorethylene is somewhat similar to that of chloroform.

2. The liquid is heavy and colorless with specific gravity of 1.47 at 15° Centigrade (89° Fahrenheit). The boiling point is 87° Centigrade (188.5° Fahrenheit) which is higher than that of water.

3. The agent vaporizes slowly and

(*Continued on page* 465)

*Presented before the Twenty-Third Annual Congress of Anesthetists, Joint Session of the International Anesthesia Research Society and the International College of Anesthetists, Montreal, Canada, October 18-21, 1948.

Histology and Dynamics of CAPILLARIES *and* ARTERIES *(Part One)*

HANS ELIAS, Ph.D., Chicago

DIGEST

The contemporary concept of histology is that of a science in which the third dimension, depth, and the fourth dimension, time, are vastly important.

In this presentation an attempt is made to realize these conditions with blood vessels. Blood vessels were chosen as the initial exponents of a three-dimensional, functional histologic study because they are relatively simple elementary organs present in all other tissues and organs as an integral part of them.

The Importance of Histology

No biologic subject can be understood without knowledge of the cells and their place and arrangement in the organism, nor can the function of a particular organ be comprehended without understanding its histologic organization. Therefore every program of study in one of the life sciences begins with the science of cells and tissues.

The Difficulties of Understanding Histology

Histology leads the investigator into a territory far from everyday experience, into a world which cannot be penetrated with the unaided senses. Even the microscope and its accessory tools give no correct and undistorted view of this world of the minute.

Methods of Study are Imperfect—Experienced histologists have difficulty visualizing the structure of a complicated organ because of the imperfect methods of study available, and distinguished microanatomists have often failed disastrously in their interpretation of the microscopic image.

The world of histology is a three-dimensional world (even four dimensional, if the rapid and slow changes which organs undergo in time are considered), but because of clumsy methods of observation this world cannot be seen as it is.

Microscopic Examination is From One Side Only—Just as that side of the moon turned away from the earth cannot be seen by us, cells seen in the microscope can only be seen from one side. It is impossible to walk around a cell, a blood vessel, or a muscle fiber as one can walk around a sculpture to regard it from all sides. The investigator cannot pass between cells and fibers through the tissue spaces as he would through the streets and alleys between the buildings of a city.

If the observer could become as small as a bacillus and wander about the interior of a human body with flashlight and dissecting instruments, perhaps a better insight into the workings of the human organism might be gained. This cannot be done physically. But it is necessary to use the imagination to do precisely this. At the same time it is necessary to guard by the severest self-criticism against the fallacies of the imagination.

Techniques of Histologic Study

The organs may be studied by tearing them into small bits so that their component parts can be observed. By this procedure the parts are dislocated from their natural positions and the organ is badly distorted.

The Coagulation Method—To avoid dislocation and distortion the coagulation method by which organs are exposed to the action of chemicals which kill and harden them has been evolved. Although the structure and the arrangement of its molecules are greatly altered by the coagulation method this is today the most useful and the most widely used.

An Essential Factor Destroyed—While the molecular changes occur mostly in the submicroscopic field and do not greatly interfere with observation, the coagulation method destroys one highly essential factor: time. The cells are frozen instantly in the pose in which they were at the moment of fixation.

Difficulties Encountered in the Coagulation Method—Even after coagulation, an organ is not yet accessible to microscopic observation as in most cases it is too large to be placed under a microscope and must, therefore, be cut into extremely thin

slices which must be stained artificially in order that detail may be seen.

These thin, two-dimensional slices are what the histologists and the students see and study. The temptation is present to identify the slice with the organ, forgetting that above and below the slice, during life, there were parts of the organ.

The Modern Concept of Histology

Some of the objectives of the contemporary teacher of histology are the following:

1. He attempts to demonstrate that what is seen under the microscope is not the natural organ itself but only a thin, frozen slice of it.
2. He tries to create (A) a visualization of the third dimension which is depth, and (B) an awareness of the fourth dimension which is time.
3. He defines an organ as an object occupying space, changing and performing its functions in time.

Histologic Study of Blood Vessels—In this presentation an attempt has been made to realize these objectives with blood vessels. Blood vessels have been chosen as the first contribution to a three-dimensional functional histology series because they are relatively simple, elementary organs, present in all other tissues and organs and constituting an integral part of them.

Intention of the Study—Merely to pictorialize the vessels and their material parts as structural entities would be valueless. The components of the capillaries and arteries (the endothelial cells, the muscle cells, the elastic fibers and membranes) are shown in action. The intention of this approach is to enhance the understanding and enjoyment of histology by a spatial and dynamic conception.

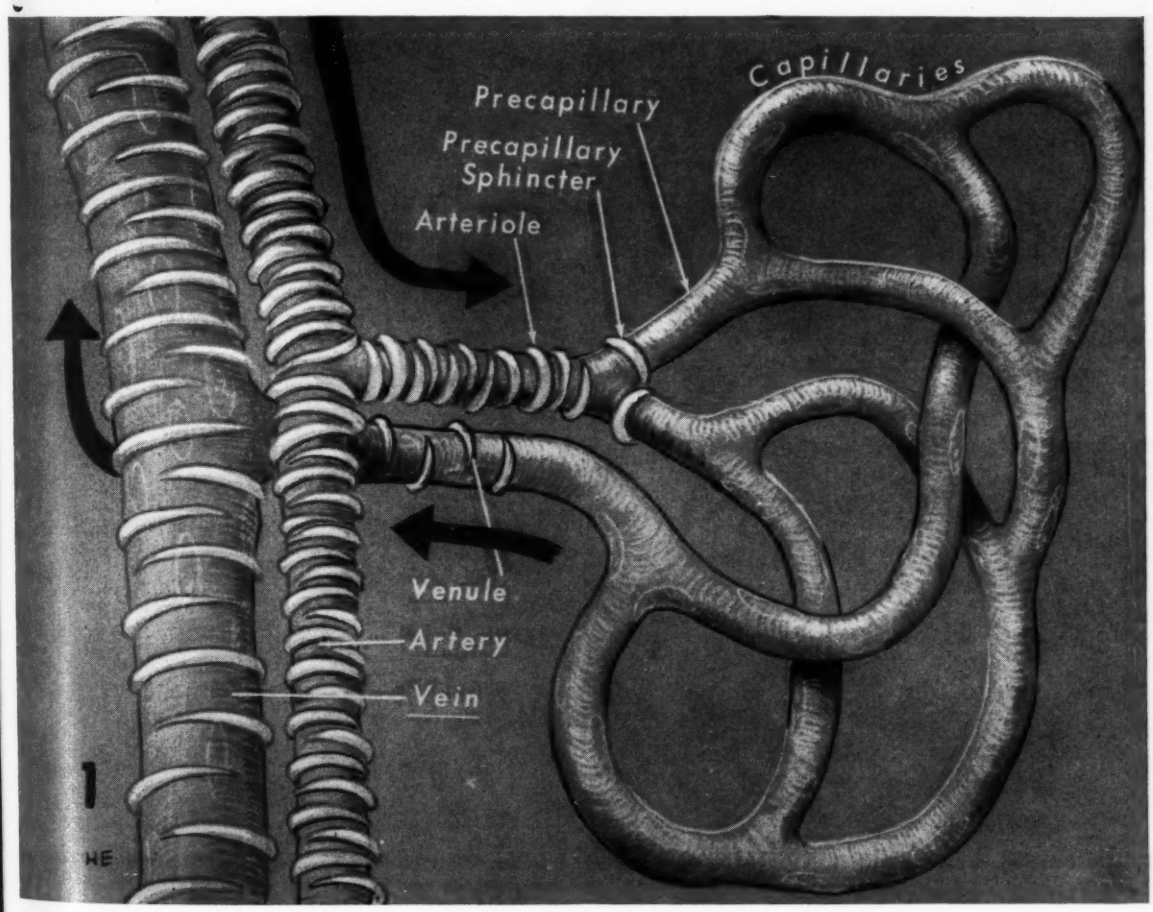
Chicago Medical School
710 *South Wolcott Avenue.*

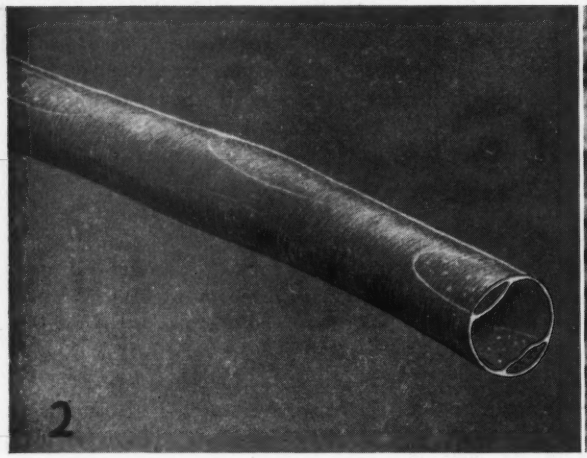
Author's Note: Grateful acknowledgement is made to Mrs. Virginia Cordrey for the rendering of Figures 11, 12, and 18; and to Mr. Nelson Brown for technical assistance.

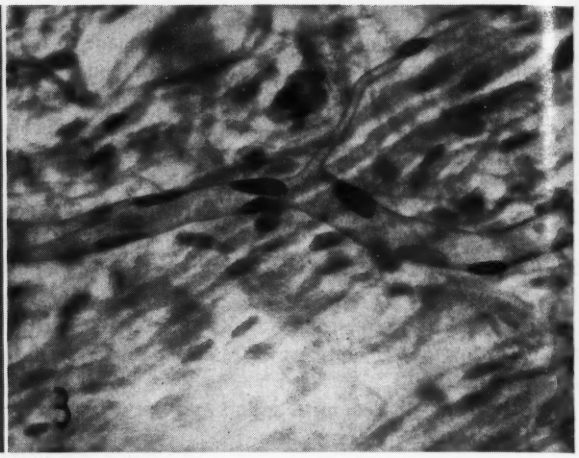
It is a pleasant obligation to thank most cordially those eminent vascular specialists who have given so generously of their time to make this illustrated presentation a success. It is a pleasure to thank Doctor Eliot N. Clark, Doctor Normand L. Hoerr, Doctor Aldo A. Luisada, Doctor James V. Warren, and Doctor Benjamin W. Zweifach for their invaluable advice.

1. ***Blood circulates in the body in branching vessels of various caliber. It flows from the smallest type of artery through an arteriole and precapillaries (which may be guarded by muscular sphincters) into the capillary bed of a limited region. It is then collected by a venule and returns through a small vein toward the heart. The exchange of substances occurs in the capillaries and veins.***

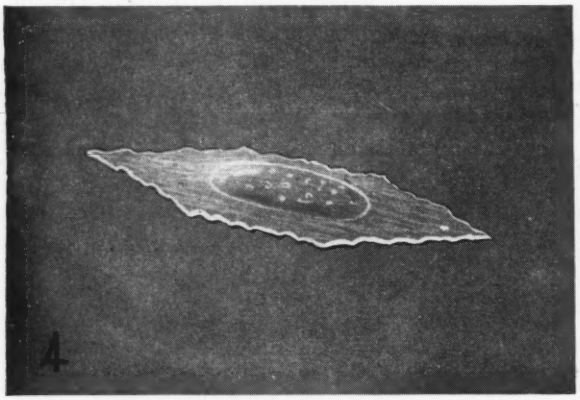
(*This article is continued on pages* 442 *and* 443)

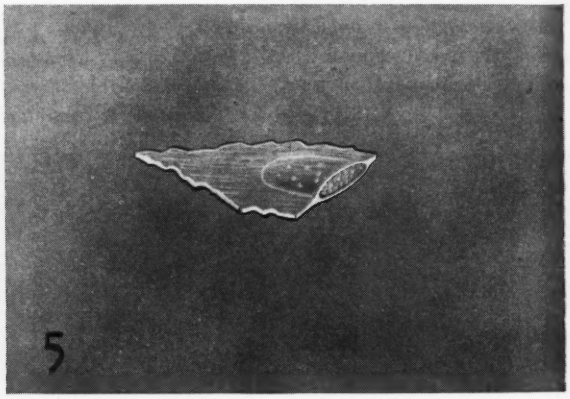






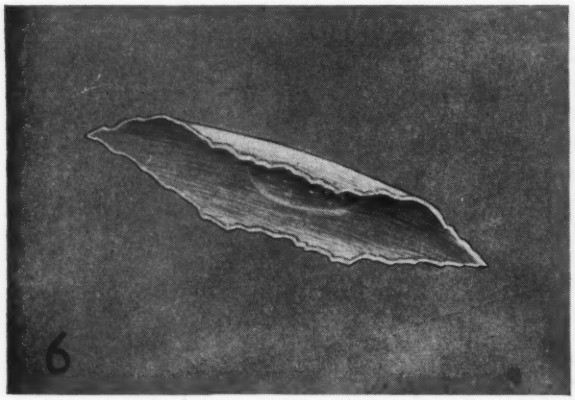
2. and 3. *The essential component of the circulatory system is the capillary, a minute, cylindrical tubule (Fig. 2) with an extremely thin wall through which certain substances and leukocytes can pass easily. So delicate is the wall of the capillary that it is almost imperceptible in a whole mount (Fig. 3). Even when stained, only the nuclei located in this wall are clearly visible. In routine preparations no cell boundaries are seen.*

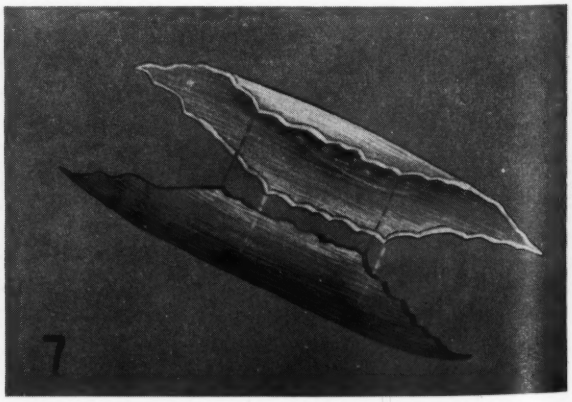




4. *The endothelial cell is the building stone of the capillary wall. It is a flattened, irregularly hexagonal cell, usually elongated in the direction of the vessel.*

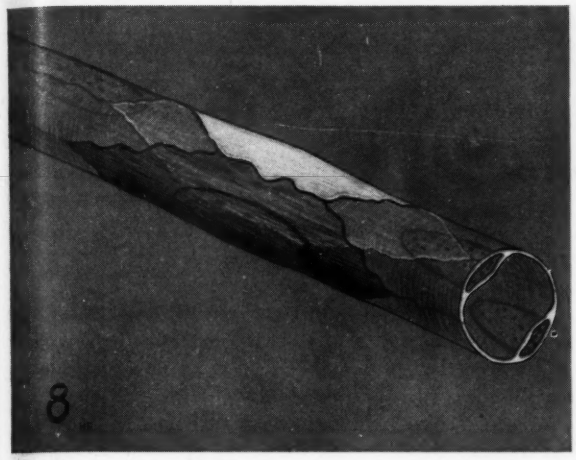
5. *Where the nucleus is located, the endothelial cell is thickened. The nucleus resembles that of a fibroblast. It is large and contains small, scattered chromatine particles. This primitive cell possesses the basic properties of cells, most important among them being semipermeability and slow contractility.*

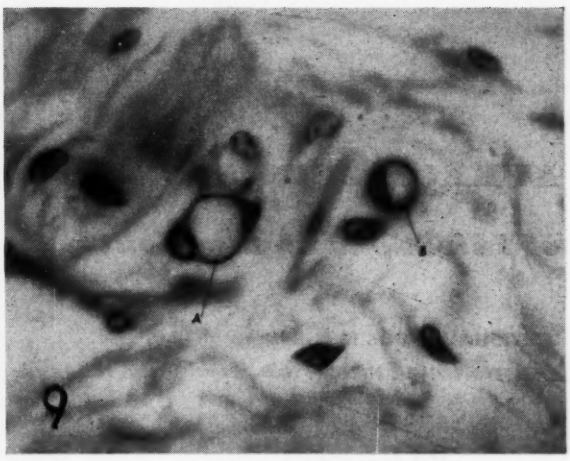




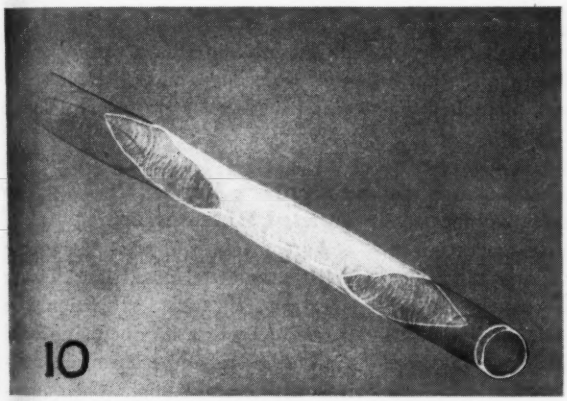
6. *As a component of a cylindrical wall the endothelial cell is curved.*

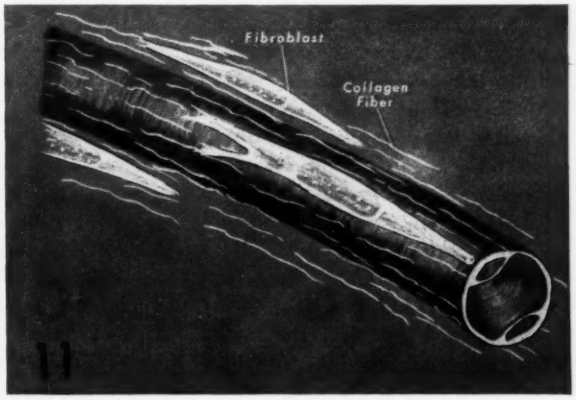
7. *Two endothelial cells usually fit together to surround an average sized capillary.*





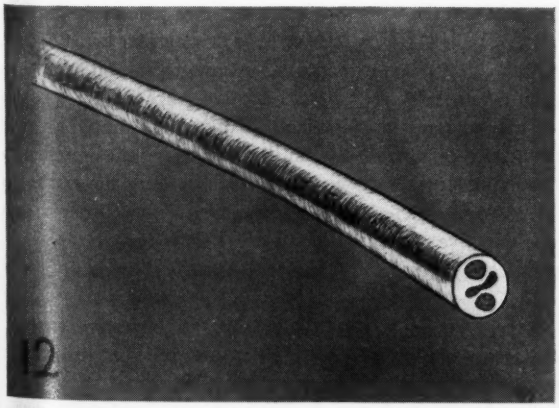
8. and 9. *The cell boundaries can be made visible with silver nitrate. The cross section of an average capillary, as seen at the cut end of Figure 8, appears in histological slides as a binucleated ring (Fig. 9A). The capillary which runs horizontally in Figure 3 is of average size. From it, an extremely narrow capillary branches off, running upward.*

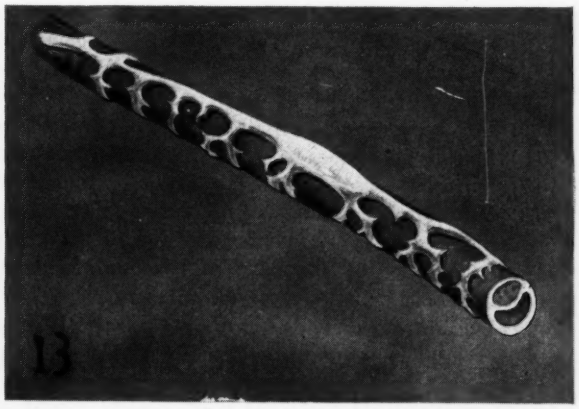




10. *A capillary of such narrowness may have a circumference of one single endothelial cell. Only one endothelial nucleus is seen along a considerable length of the smaller, upper capillary in Figure 3. A cross section of such a narrow capillary may appear as a signet ring if the section goes through the nucleus (Fig. 9B).*

11. *Almost all capillaries are located within connective tissue. The immediately adjacent fibroblasts and connective tissue fibers constitute a primitive tunica adventitia.*





12. *Capillaries can undergo narrowing. When this occurs, the endothelial cells become thicker and their nuclei become cylindrical. Some investigators believe that this is due to active contractility of the endothelial cells, while others deny this.*

13. *The "pericyte," also called "Rouget cell," has been said by a few investigators to cause narrowing of the capillaries. They believe this cell to be a branched, smooth muscle cell. Others consider it merely an adventitial cell.*

(To be continued in November)

AUREOMYCIN *in the Treatment of Infections of the Mouth*

LESTER HOLLANDER, M.D., Pittsburgh, Pa.,
and STANTON H. HARDY, M.D., Pearl River, N.Y.

DIGEST

When an antibiotic is indicated to combat infections having their primary foci in the oral cavity, aureomycin is admirably suited. It has been demonstrated that aureomycin has the equivalent of the combined range of therapeutic activity against bacteria included in penicillin, streptomycin, and the sulfonamides. The agent has also proved effective against certain virus or virus-like microorganisms.

As the oral cavity is the favored environment of most of the microbic entities, the value of aureomycin is obvious.

Variety of Microorganisms

In general, the microbic inhabitants of the oral cavity include representatives of the following bacteria:

(1) Staphylococci
(2) Streptococci
(3) Pneumococci
(4) Meningococci
(5) Rod bacilli
(6) Spirilli
(7) Spirochaeti
(8) Viruses of unclassified nature

suposedly existing in a symbiotic balance, controlled by a number of synchronized factors.

Synchronized Factors—1. The unbroken continuity of the anatomic structures.

2. The normal exfoliation of the outermost stratum corneum of the mucous membrane.

3. The hydrogen ion concentration of the saliva.

4. The mechanical damage occasioned by mastication and deglutition.

5. The local effects of egress and exit of gases.

6. The pungent quality of drink and food.

7. The self-asserted phage action of the various microorganisms themselves, to which are accredited important roles.

Result of Biologic Imbalance—Upsetting the biologic balance in any of the component factors may lead to a changed set of circumstances advantageous to any or all of the microscopic intraoral organisms. The result may be the creation of an unhealthy process which is recognized as an infection.

Immunity-forming Mechanism Taxed—By their numerical expansion the great range of organisms may easily change their saprophytic nonbelligerent status to that of a pathogenic, destructive, and aggressive enemy. Added strength is gained from the variety of their numbers.

A Single Agent Not Effective—Heretofore, no specific material has been prepared to provide complete counteracting efficiency as the nature of the antitoxic, bacteriocidal, or bacteriostatic action of the substances utilized made them effective only against some of the infecting microorganisms.

Specific Uses of Aureomycin—The fact that aureomycin is antagonistic to most of the diversified flora of the microbic environment makes it an admirable antibiotic for general purposes in the oral cavity. It has been applied successfully for the following conditions:

1. Herpes simplex
2. Herpes zoster
3. Recurrent aphthous stomatitis
4. Streptococci perleche
5. Vincent's angina
6. Cellulitis of the floor of the mouth
7. As an adjuvant and as a prophylactic agent after a variety of surgical procedures on (1) the lips, (2) gingival tissue, (3) buccal mucosa, (4) tongue.

Effective in the Field of Dental Extraction

Aureomycin is of great therapeutic value after dental extractions. Tissues damaged through extraction are prone to become the incubation and the culture tubes of harmful organisms of the oral cavity. When aureomycin is utilized the tissues are free to reuild the protective barriers by re-establishment of tissue continuity.

Prophylactic Application—Because of the danger of the development of subacute bacterial endocardities following teeth extractions in patients having organic valvular heart disease, acquired or congenital, all such cases should receive aureomycin prophylactically. The patient should be given 250 milligrams every six hours, starting a day or so before the extraction and continuing for three or four days afterwards.

General Postoperative Purposes—The following regimen is recommended for postoperative treatment:

1. 250 milligrams of aureomycin every six hours for the first two days.
2. 250 milligrams of aureomycin every eight hours for the next two days.
3. 250 milligrams of aureomycin

(*Continued on page 447*)

The Importance of Correct Jaw Relations

IN CERVICO-ORO-FACIAL ORTHOPEDIA

VICTOR STOLL, D.D.S.

Proper Jaw Relations of Major Importance in Dental Practice

Jaw relations have an influence not only on the maxilla, the mandible, and the teeth but may affect other structures of the head and neck. Abnormal jaw relations may be a factor in the causation of painful syndromes involving these and more distant structures as the result of trauma, not only to the supporting tissues, but to the nervous system as well.

Varied Functions of the Dental Mechanism

As an integrated part of the harmoniously working body as a whole, the dental mechanism participates in many functions besides mastication: (1) speech, (2) respiration, (3) maintenance of correct postural relations with other parts of the head and neck, and (4) esthetics.

Mastication and Deglutition—The performance of mastication and deglutition involves not only the teeth and jaws and their attached muscles, but these structures of the head and neck: (1) the cheeks, (2) the lips, (3) the hard and soft palate, (4) the tongue, (5) the hyoid bone to which the mandible and the tongue are attached, (6) the entire musculature of the throat, (7) the larynx, (8) the muscles of facial expression, (9) the head, balanced on the spine, and (10) the cervical spine.

Anatomically and physiologically we are concerned not only with jaws, teeth, and muscles of mastication, but with all the structures of the head and neck. The correction of their abnormalities is orthopedic in nature. It is, therefore, appropriate to designate these corrections as cervico-oro-facial orthopedia.

Syndromes due to Malposture or Malposition of the Mandible—As a result of direct trauma, distortion of the relations of the structures of the head and neck, and noxious reflexes irritating the nervous system these conditions are observed:

1. Radiation of pain to the head, neck, mouth, tongue, throat, ears, and eyes.
2. Muscle spasm in various groups of muscles in the head and neck.
3. Interference with mastication, swallowing, vision, hearing, speech, and breathing.
4. Psychosomatic disturbances.

Correct Posture a Prerequisite—In the conservation of health and energy correct posture, statically and dynamically, is essential. The first prerequisite is alinement of all the skeletal parts in harmony with gravity and balance.

Effects of a Structure in Abnormal Position—1. The postural maintenance against gravity is disturbed.

2. To maintain equilibrium and balance, one set of muscles is called upon to function at the expense of others.

3. Added strain on muscles creates in them a state of increased tension (hypertension) and in the antagonistic muscles decreased tension (hypotension).

4. Various symptoms may be caused by disturbance in structural relationships and neuromuscular balance.

Anatomic Relations

1. The various positions assumed by the mandible in function may influence structures nearby and extend into the shoulders and chest.

2. It is conceivable that all these structures may be disturbed in function by a malposture (1) of the mandible, and (2) of the hyoid bone with its muscular and fascial attachments.

3. With its anti-gravity extensor muscles and its connection with the hyoid mechanism, the mandible occupies a commanding position in the dynamics of the important structures of the head and neck, and contributes to the normal body mechanics necessary for good health.

Potentialities for Pain Reference and Disturbed Function—In considering the potentialities for pain reference and disturbed function that can result from dental abnormality, one organ, the tongue, is an example of the anatomic complexities that exist.

Description—The tongue receives innervation from many sources:

1. From the gustatory branch of the fifth nerve to the papillae at its front and sides for general sensibility.
2. From the chorda tympani of the seventh nerve carrying taste from the front of the tongue.
3. From the lingual branch of the glossopharyngeal nerve serving taste buds along the base and sides and the circumvallate papillae.
4. Motor innervation from the hypoglossal.
5. From the superior laryngeal branch of the vagus which sends a few filaments to the base of the tongue from its internal branch.

Seat of Referred Pain—It is readily understood how the tongue may become the seat of referred pain from a distant source of irritation in any organ innervated by the trigeminal, vagus, or glossopharyngeal nerves.

Traumatic Occlusion

Definition—Traumatic occlusion may be defined as any trauma-producing occlusal relation (1) in either eccentric or centric position, (2) with incomplete and uneven contact of all the teeth, (3) resulting in unequal destructive distribution of forces on the chewing mechanism.

Noxious Results—1. A traumatic situation is mechanically inefficient for the process of chewing, and the noxious stimuli which arise can serve no useful purpose to the central nervous system.

2. After chewing is completed the remaining inbalance does not permit the symmetrical inflow of stimuli that would allow the end of activity. Thus there is a continuation of a ceaseless inflow of impulses that do not disappear, but must result in outflow from the nervous system with the production of undesired effects such as spasm or pain.

3. Frustration of the natural need for the end of an act may result in what may be described as an occlusal neurosis.

4. The nerve cells at the higher level, seldom at rest, need constant supplies of oxygen and food. Normal activity may cause prolonged changes in the very small reserves at their disposal. A disturbing stimulus, therefore, may produce widespread effects by altering the balance of forces acting on each element.

Comment

1. A background has been prepared for a better understanding of a variety of syndromes around the head and neck.

2. It has been suggested that certain symptom complexes often have as their underlying cause traumatic occlusion and mandibular malposture.

Treatment

Structural—The first phase of treatment, based on the laws of physics, involves reorientation following a definite geometric plan.

Physiologic—The second phase of treatment consists of muscle reeducation for efficient use of the structurally correct dental apparatus.

Balance—1. For purposes of balance the functioning parts must be structurally arranged so that all the opposing forces are synchronized and work in harmony with each other.

2. The entire dental apparatus should be in a state of balance so that it can function (1) as a unit, (2) smoothly, without interference, and (3) with a minimum of expenditure of energy, avoiding the destructive effect of trauma.

3. In treating malposture of the mandible it is not always possible to reach nature's ideal normal. Acceptable balance, however, is usually possible to attain.

An Orthopedic Problem

Approached as an orthopedic problem, treatment is guided by the following facts: 1. The human dentition is arranged on a spherical outline, with its center in the skull in the region between the glabella and the sella turcica. 2. The upper teeth present a convex surface and the lower teeth a concave surface. 3. The convexity must fit the concavity in order to obtain the maximum amount of contact for balance and proper function. 4. The entire dental mass presents itself as a conical segment of a sphere, with a radius of approximately four inches.

The Structural Center—It is necessary to find the structural center of the dental mass in the skull and the proper radius on which it is arranged for each case.

Use of a Precision Instrument—A set of geometric precision instruments have been evolved by the author making it possible (1) to orient the dental mass in the instrument exactly as it is framed in the skull, with the same relation to the structural center and the three orientation planes, (2) to determine and measure accurately structural deviations within the dental apparatus, and (3) to reproduce and analyze all movements of the mandible in three dimensions.

The diagnostic information obtained permits the establishment of balanced occlusion with precision and predictability of result.

Positioning of the Mandible

It is erroneous to accept the following assumptions as facts:

1. That centric position is the position of the mandible in the most retruded position from which lateral movements can be made.

2. That the condyle altogether guides the movements of the mandible.

3. That the condyle has a definite position in the fossa which is set at birth.

Proper Position of the Mandible in Taking a Bite—The author insists (1) that the position of the mandible can and should be changed if incorrect, and (2) that balanced occlusion cannot be attained without proper positioning of the mandible.

Alinement of the Teeth—The mandible must be so placed that the ridges of the alveolar processes are lined up horizontally, parallel to each other and in the same vertical plane, permitting alinement of the teeth in such a way that their axial inclinations meet each other in a straight vertical line.

Interdental Space—Correct alinement of the teeth creates the proper interdental space in the vertical dimension. The mandible is then in correct posture and the teeth in centric occlusion in a relation where satisfactory antagonism is established.

Effects of Centric Position of the Mandible—Correct centric position of the mandible (1) permits opposition of the lower and upper teeth in correct occlusion, (2) provides the proprioceptive information for proper jaw relationship, (3) initiates the dynamics of the entire dental apparatus, and (4) establishes the correct contact stimuli which are physiologically the most fundamental of all stimuli.

Discussion

1. Nature has provided the gums and hard palate with a tough tissue of a lowered sensibility which serves as a mat against which food may be mashed with the assistance of the tongue, cheeks, and lips.

2. When the mandible is retruded the chewing process takes place more posteriorly, in a more sensitive region, and impinges on the soft palate and posterior part of the tongue.

Problem—Frequently patients with deep overbites present themselves with inflamed uvulae and the following symptoms: (1) throat irritation, (2) burning sensation in the mouth, and (3) strain in the temporal region and the muscles of the neck.

Solution—When necessary, especially in cases of deep overbite, the

mandible should be established in a more forward position (1) to meet the upper teeth correctly, and (2) to permit proper use of the adjacent soft tissues.

Results—1. By proper horizontal and vertical alinement of the mandible with the maxilla, the other structures of the mouth and neck (the tongue, pharynx, larynx, trachea, thyroid cartilage) fall in line through the hyoid bone which is the center of all the motions of the throat and tongue.

2. The importance of the funnel-like space extending from the base of the skull to the mediastinum, bounded posteriorly by the axial skeleton, and anteriorly by the visceral skeleton (mandible, hyoid bone, thyroid and cricoid cartilages and trachea) and its muscular attachments, is emphasized. Correct positioning of the mandible keeps this funnel-like space wide open and straight, and creates the proper space in the pharynx and neck so necessary for proper breathing, swallowing, speech, and hearing.

Summary

Consideration of the facts discussed in this article support the following conclusions:

A) The importance of correct mandibular posture for the establishment of centric position in balanced occlusion.

B) The necessity of correction of mandibular malposture for the elimination of painful syndromes around the head and neck when caused by trauma due to malarticulation and malocclusion.

C) The need for visualization of the normal based on nature's geometric architectural plan.

D) The significance of balance and coordination in structure and function.

E) The harmful effect on the health of malalinement and malcoordination of the jaws.

F) The value of precision instruments as a guide in diagnosis and treatment.

Adapted from *Dental Concepts* **2**:5-18 (April) 1950.

Aureomycin in the Treatment of Infections of the Mouth

(*Continued from page* 444)

once a day for the following two days when the treatment is terminated.

4. Larger doses for a longer period may be needed when an acute infection is encountered.

Treatment of Cellulitis—A rapidly developing and menacing form of cellulitis of the floor of the mouth followed an unattended puncture wound. The patient, a 42-year-old machinist, was given 500 milligrams of aureomycin every three hours for one week followed by gradually reduced doses for a period of two weeks when he was dismissed as cured.

Vincent's Stomatitis

In most instances of trench mouth (Vincent's stomatitis) troches aureomycin, 15 milligrams each, are effective.

Indications for Use—Troches aureomycin are useful in the following infections of the mouth and the pharynx:

1. Gram positive infections
2. Gram negative infections
3. Mixed infections

Severe infections may also require systemic therapy with aureomycin capsules.

Precaution—If irritation follows the use of troches, discontinue this form of medication.

Conclusion

Aureomycin hydrochloride is a potent antibiotic when taken by mouth. An intravenous preparation is available for use when indicated and when aureomycin cannot be administered orally.

631 *Jenkins Building.*

Conservative Treatment of Trigeminal Neuralgia

Sole Sagarra and Alonso de Olarte[1] direct attention to the causal role of irritation of the gingival end branches of the trigeminus on the development of trigeminal neuralgia and onset of the crisis.

A large number of patients of either sex between the ages of 36 and 82 years in whom neuralgia had lasted for five to fifteen years are cited.

The following agents had failed to relieve symptoms: (1) vitamin B_1, (2) roentgen therapy, (3) nicotinic acid, (4) bee venom and histamine iontophoresis.

The point of maximal pain in the majority of the cases was on either the upper or the lower gingival tissue.

With other types of neuralgia the differential diagnosis was made by the following characteristics of pain: (1) the sensitivity of the whole trigeminal territory is intact, (2) the bouts of pain are intermittent, (3) pain is not associated with pain from other nerves.

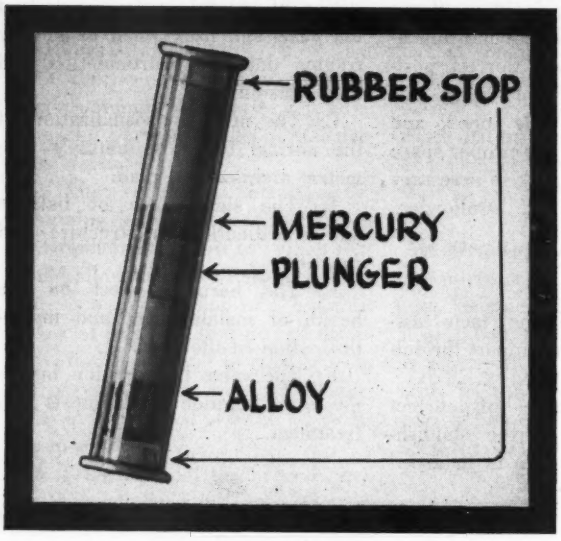
Infiltration of the gingival tissue with a 20 per cent phenol solution in glycerin was made at the point of maximal pain. Neuralgia was controlled by the first infiltration in all cases.

In 3 of 6 cases neuralgia recurred one or two years after infiltration. The pain was milder than it was before the treatment and was controlled by a second infiltration given at the same point.

In two cases permanent cure was obtained from one infiltration without recurrence, two and five years, respectively, after treatment.

From Current Medical Literature, *Journal of the America Medical Association* **143**:850 (July 1) 1950.

[1]Sagarra, J. Sole, and de Olarte, L. Alonso: Conservative Treatment of Trigeminal Neuralgia. *Anales de Medicina y Cirugia,* Barcelona **25**:373-452 (Nov.) 1949.



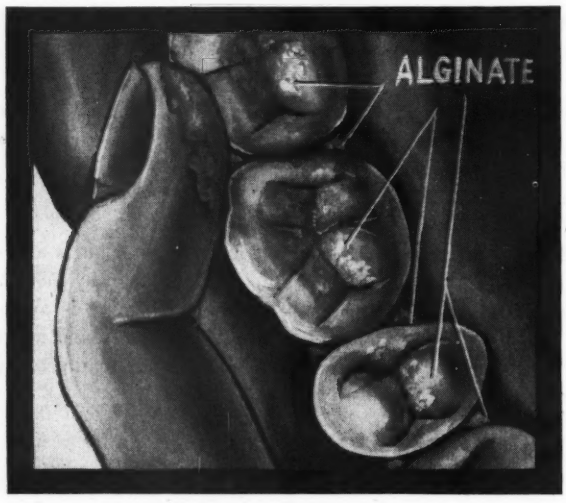
1

Clinical and Laborator

Rapid Dispensing of Alloy and Mercury

David Saunders, London, England

1. A discarded anesthetic tube is separated into two compartments by the rubber plunger. Into one compartment is placed an accurately weighed amount of alloy, into the other mercury. The ends of the tube are resealed with the rubber stops from the tube. Cartridges are prepared for "small," "medium," and "large" restorations.

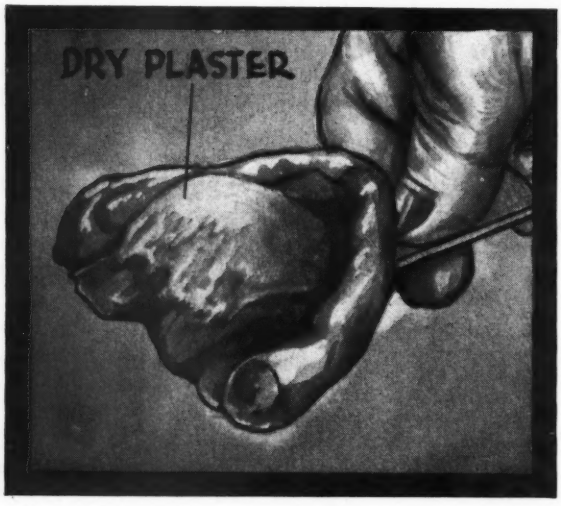


2

Better Alginate Impressions

M. Furgang, D.D.S., Pelham Manor, N.Y.

2. Load the impression tray with alginate. Before seating the tray take some alginate on the index finger and brush it onto the occlusal surfaces of the teeth and into the interproximal areas. For upper impressions it is also advisable to brush alginate onto the vault of the palate.



3

Better Models

Frank H. Nealon, D.D.S., Lakewood, Ohio

3. The tenacity of the mucin constituent of the saliva is responsible for many inaccurate and rough models made from otherwise flawless alginate or hydrocolloid impressions.

Ordinary washing under tap water fails to remove the ropy mucin. To prepare the impression for pouring: 1. Wash under tap water, leaving as much water as possible in the impression. 2. Fill the impression with *dry* stone or plaster according to which is desired in the finished model. 3. Wash out completely after one minute. The initial set enmeshes all saliva and mucin which is then easily washed out.

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For every practical clinical or laboratory suggestion that is usable, DENTAL DIGEST will pay $10.00 on publication.

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SUGGESTIONS . . .

Preparing Resin Teeth

Clyde E. Blattman, D.D.S., Cincinnati

4. Resin teeth often become slippery while they are being prepared. To make them easier to hold touch the fingers to a baseball pitcher's rosin bag.

4

A Method of Acid Fume Control

A. L. Roberts, D.D.S., Aurora, Illinois

5. Materials: A 4-inch pyrex baking dish about 2 inches high; a pyrex custard cup, #425 B-P; a dappen dish small enough to fit within the custard cup.

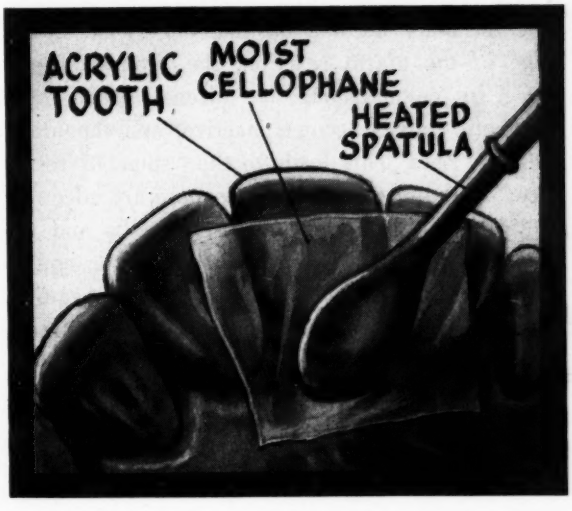
Pour about ½ inch of water in the 4-inch baking dish and stir in 1 teaspoonful of bicarbonate of soda. Fill the dappen dish about half full of the usual pickling solution and place it in the 4-inch baking dish containing the neutralizing solution. Invert the custard cup over the dappen dish with the edge well within the soda solution.

5

Replacing a Denture Tooth

R. O. Azarcon, D.M.D., San Jose, Nueva Ecija, Philippines

6. Fit a suitable acrylic tooth and secure retention in the base with a bur. Apply monomer to the denture base. Mix a batch of fast setting acrylic, place it in the preparation, and place the tooth in position. Cover the tooth and the soft acrylic with a piece of moist thick cellophane. Heat a spatula and place it over the acrylic. Repeat the procedure until the acrylic repair has hardened.



6

technique involved; and jot down the advantages of the technique. This shouldn't take ten minutes of your time.

Turn to page 462 for a convenient form to use.

Send your ideas to: Clinical and Laboratory Suggestions Editor, DENTAL DIGEST, 708 Church Street, Evanston, Illinois.

The EDITOR'S *Page*

LAST MONTH in this department the possible implications to dentists of the use of ACTH and cortisone were discussed. The injection of these hormones induces a reaction within the organism that is usually more pronounced than the reaction that follows the intrinsic production and secretion of adrenal corticoid hormones. The autonomic-pituitary-adrenal mechanism is responsible for the adaptation syndrome which is described by Selye:[1] "All living organisms can respond to stress as such, and in this respect the basic reaction pattern is always the same, irrespective of the agent used to produce stress. We call the response the general adaptation and its derailments the diseases of adaptation.

"Anything that causes stress endangers life unless it is met by adequate adaptive response; conversely, anything that endangers life causes stress and adaptive responses. Adaptibility and resistance to stress are fundamental prerequisites for life and every vital organ and function participates in them."

A noxious stimulus — chemical, bacterial, physical, or psychic — initiates a chain reaction within the body, the so-called alarm reaction. In the first or "shock" phase the heart beat is quickened, the concentration of sugar and sodium drops, the blood pressure falls, and epinephrine is released from the adrenal medulla. The epinephrine stimulates the anterior lobe of the pituitary to release ACTH. The ACTH stimulates the adrenal cortex to secrete cortisone and other steroids and thus begins the second stage of the alarm reaction, the "countershock" phase. In "countershock" the adrenals enlarge, the lymphatic tissues become inactive, and the blood pressure rises. This leads to the "stage of resistance." If the mechanisms of response are adequate and properly balanced, recovery results and the nervous and humoral mechanisms return to equilibrium: to homeostasis. If, however, the organism does not return to equilibrium and the adrenal cortical hormones continue to pour into the body, two things may result: (1) "Diseases of adaptation" may develop — hypertension, kidney involvements, myocardial lesions, arthritis, for examples, or (2) the hormonal secretions may be so excessive that the "stage of exhaustion" appears which is a shock-like state and is the prelude to death. The organism is damaged or destroyed by "an excess of its own defensive measures."

Now, if we look back to what was written last month in this department concerning delayed wound healing, decrease in resistance to inflammation and infection brought about by the deliberate use of ACTH and other cortical steroids in the treatment of disease, we discover an important clue concerning disease in general. *When adrenal cortical hormones are produced in excess by the body itself, diseases of adaptation may result. And these diseases are characterized by atrophy of lymphatic tissue, reduction of vital cells in the circulating blood, decrease in fibroblasts, and lowered resistance to inflammation and infection.*

When the autonomic nervous system and the adrenal mechanisms are functioning properly we have good health and marvelous powers of adaptation. Excessive function results in diseases of adaptation and death.

Not for a moment must we forget that the noxious stimulus that sets in motion the chain reaction may originate in the cerebral cortex: *the mind rules the body*, or if you prefer, *the nervous and humoral mechanisms rule the body and the life processes.*

Selye concluded his address before the British Medical Association:

"Disease consists of two components — damage and defense. Up to now medicine attempted to attack almost only the damaging pathogen (to kill the germs, to excise tumors, to neutralize poisons).

"As regards defense, hitherto medicine limited itself to such vague advice as the usefulness of rest, wholesome food, etc. A study of the general adaptation syndrome suggests that henceforth we will be able to rely upon much more effective means of aiding adaptation to non-specific local or systemic injury by supplementing the natural defensive measures of the general adaptation syndrome whenever these are suboptimal."

[1]Selye, Hans: Stress and the General Adaptation Syndrome, Brit. M. J. No. 4667: 1383-1392 (June) 1950.

MEDICINE and the Biologic Sciences

Altitude vs. Alcohol Tolerance

Many aviators contend that a dose of alcohol which will not produce symptoms of intoxication at sea level will do so at high altitudes.

It is desirable to know just what effect alcohol does have as air lines serve alcoholic beverages aloft and it is reasonable to assume that some air passengers will drink before embarking.

Studies were conducted on a group of persons all in good physical condition. None could be classed as excessive drinkers. The results showed that the intoxicating effect of alcohol can be enhanced by a lowered oxygen tension. If one subscribes to the theory that the effect of alcohol on the nervous system is due to a histotoxic anoxia, it seems reasonable that the addition of some degree of anoxic anoxia will produce an additive effect.

It has been clearly demonstrated that an alcoholic concentration in the blood which is incapable of producing measurable signs of intoxication at sea level may produce such signs at an altitude of 18,000 feet. Further study is being done to ascertain the effect of lower altitudes on alcoholic tolerance.

Altitudes of 18,000 feet are seldom encountered on commercial flights except in aircraft with pressurized cabins. Therefore, it seems unlikely that the reduced oxygen tension ordinarily encountered in passenger aircraft will significantly reduce tolerance to alcohol in most persons.

Newman, H. W.: Effect of Altitude on Alcohol Tolerance, Quart. J. Stud. on Alcohol **10**:398-404 (*December*) 1949.

The Geriatric Examination —Essentials

The geriatric examination has to do with age and aging. It can be given appropriately at any age during life from minus nine months to 90 years of age and over. Popular and medical interest focus the time of the geriatric examination to the period after 40 or 50. This is when damages and deteriorations accumulate and begin to project themselves with increasing insistence.

Some clinicians believe that if the majority of persons would have a thorough geriatric examination at the age of 50, and follow it up with sound geriatric anti-aging service, they would live on the average ten to twenty years longer. They would also have twice the joy of life with half the pain.

The geriatric examination is a health examination with the added purpose of longevity. The examination includes the whole man—his whole life, past, present, and to come. It is far more than the routine disease examination which it includes.

There are two essential forms of the geriatric examination. (1) Research, used on large numbers of persons to compile information. It is basically longitudinal. From it valuable information is obtained. (2) Clinical and hygienic examination for personal service. The clinical examination is a research challenge of the situation at hand. With its life management purpose it has numberless unknown quantities.

There are seven kinds of age. The first four are biologic and the last three are ages of record: (1) anatomic age, (2) physiologic age, (3) psychologic age, (4) pathologic age, (5) chronologic age, (6) statistic age, and (7) heredity age. The geriatric examination concerns all of these.

"There is nothing that can be found in the man that has not been foreshadowed in the lives which produced him." The geriatric examination is not complete until we have examined the living conditions of the person. "The family is not only an organization, it is a living organism." This stresses the importance of the integration of social and psychologic services as part of the geriatric examination and program.

Chronologic age is defined in the fields: (1) anatomy, (2) physiology, (3) psychology, and (4) pathology. The number of teeth that a man has lost is equally historic, diagnostic, and guiding. Many other signs of anatomic aging have their counterparts in physiologic aging.

Every function of the body changes, and most commonly, declines with age. The nervous system, the endocrine glands and the circulatory system are the areas of interest. All these are influenced strongly by nutrition.

Man ages by damage more than by the mere passage of time. Part of the examination should be directed toward detecting signs of disease to come. Prevention and discovery and removal of pathologic aging is the heart of geriatrics. The geriatric examination is a challenge. Its benefits definitely warrant the attention that is making geriatrics a major branch of medicine.

Crampton, C. Ward.: The Essentials of the Geriatric Examination at 50, Geriatrics **5**:1-14 (*January-February*) 1950.

Glaucoma

The diagnosis of glaucoma is highly technical and often difficult even

ly well-trained specialists. However, it must be watched for, inasmuch as between 30 and 40 per cent of the blindness in the nation is caused by glaucoma.

Treatment must be instituted early if glaucomatous eyes are to be saved, for vision in eyes blinded by chronic glaucoma is never restored. If the disease is discovered early and proper treatment begun at once, less than 8 per cent of the eyes so affected become blind.

It is important in the middle-aged patient to be suspicious of glaucoma if the patient complains of the following symptoms: (1) transient attacks of blurred or smoky vision, (2) halos or rainbows about lights, (3) eye pain or blurred vision after movies, in dim lights or after periods of emotional strain. One should be particularly suspicious of the person who has great difficulty with near work despite frequent changes of glasses.

If there is a family history of glaucoma all persons past forty should be suspect. Any person with one or more of the symptoms mentioned should be referred to an oculist for thorough glaucoma check-up.

Glaucoma can be controlled, not cured. If medical treatment controls the intra-ocular pressure, the patient must use miotics regularly for the rest of his life. If uncontrolled by medical treatment, an operation is indicated. Valuable time must not be lost by delaying the decision.

Many patients fail to realize the seriousness of the problem which confronts them. Frequently these patients return later for a cataract or some other operation in the hope of relieving a glaucomatous optic atrophy which has caused total blindness.

Occasionally an acute type of glaucoma is noted. It is frequently preceded by transient attacks of blurred vision or halos about lights about which the patient complains little. An acute attack is precipitated by an emotional crisis such as an unexpected death in the family, an elopment, or a financial disaster.

In these patients there is an anatomic abnormality in the chamber angle of the eye. The angle is narrow and dilation of the pupil embarrasses the exit of aqueous humor. The intra-ocular pressure rises rapidly to fantastic heights. If relief is not obtained promptly by powerful miotics or surgery the eye is blinded within a matter of a few hours, or, at most, several days. The clinical picture is not always clear-cut. The diagnosis is confused with iritis. Atropine must not be administered as it furthers the dilation of the pupil. And by the time the patient is seen by the oculist the eye is totally and permanently blind.

Trauma may lead to glaucoma. And here again it is imperative that the patient be referred to the oculist. Surgery must not be delayed if it is necessary.

Rychener, Ralph O.: Glaucoma in General Practice, The J. Michigan M. Soc. **49**:205-206 (February) 1950.

Carbon Tetrachloride Poisoning

The potential toxicity of carbon tetrachloride is seldom realized. Most American homes usually have a can of cleaning fluid for removing spots or for other purposes.

Seldom do the labels on the cans state that the fluid contains carbon tetrachloride, nor is there any mention of the toxic nature of the fluid. This information should be stressed as fatalities from carbon tetrachloride poisoning have been reported recently.

National regulations for labeling these compounds should be mandatory and should be required even for quantities fewer than 15 fluidounces. Far less than this amount will cause death if inhaled or ingested. One teaspoonful taken by mouth may be fatal. The fumes from one cupful breathed in a poorly ventilated place may cause death.

Labels should state the following warnings: (1) Use with adequate ventilation. (2) Avoid prolonged or repeated breathing of vapor. (3) Avoid prolonged or repeated contact with skin. (4) Do not take internally.

Often when mild cases of poisoning are detected they can be corrected by substituting trichloroethylene for carbon tetrachloride.

Norwood, W. D.; Fuqua, P. A.; and Scudder, B. C.: Carbon Tetrachloride Poisoning: More Regulation, More Education Needed, Arch. Indust. Hygiene and Occupat. Med. **1**:90-101 (*January*) 1950.

Corneal Transplantation

The transplantation of the human cornea from donor to host has been attempted for some time. Only in recent years has the operation met with any degree of success.

There are different types of corneal transplants. The most universal type is that in which a corneal disc is transplanted. Only this type is assured of any degree of success. Efforts have been made to remove the entire cornea and to replace this with a complete new cornea. These efforts have been completely unsuccessful.

Patients, to be considered for corneal transplants, must be carefully selected. The primary consideration is (A) whether the patient's vision can be improved, and (B) how much vision can be expected in each case. There is no exact determining line which renders one case ideal and the next case totally unsuitable.

In general, a corneal transplant can be considered when the patient no longer has useful vision either for the performance of his job or in relation to his environment. Useful vision may be considered vision below 20/20 or slightly less if the person is no longer engaged in active work and is able to support himself.

Transplantation is not advised in children because of their inability to cooperate. The initial operation is only one phase of the procedure. The patient must be still, flat on his back, for several days. The removal of the sutures is a highly important step. Such demanding cooperation is seldom obtained in the extremely young.

Mental attitude has some bearing on the decision to recommend or not to recommend a transplant. People who have lost considerable vision or

who do not have vision on a par with others are usually bitter and resentful against the world. Even though they may appear tranquil, usually they are not. The majority are high strung, nervous, maladjusted, and the uncertainty in their minds of the success of the operation adds to their difficulties. These are difficult people to handle postoperatively when lying in bed with both eyes bandaged and mental activity rampant.

Three general conditions may be considered with a favorable prognosis. These are: (1) conical cornea (keratoconus), (2) inactive interstitial keratitis, and (3) the presence in the eyes of a central scar with a surrounding healthy cornea. It is not uncommon in these instances to obtain a resultant vision anywhere from 20/50 to 20/20.

Persons with corneal dystrophies have a modified favorable prognosis. Conditions which make an unfavorable prognosis are (1) chemical burns, (2) eyes with a large degree of vascularization, (3) corneal scars extending to the periphery, and (4) various dystrophies and injuries.

Croll, Maurice, and Croll, Leo J.: Corneal Transplantation, J. Michigan M. Soc. **49**:442-449 (*April*) 1950.

Quiescent Gallstones

The incidence of gallstones in the general population is about 10 per cent. About one in twenty persons with gallstones will have carcinoma of the gallbladder.

In some quarters prophylactic cholecystectomy is strongly advocated on the basis that the expected mortality from carcinoma of the gallbladder is far greater than that of the surgery when applied to all cases of quiescent stones in which the patients are of suitable age and physical condition.

Because there is no effective treatment for carcinoma of the gallbladder, it is always considered fatal. For this reason removal of the diseased gallbladder is important.

In the aged or otherwise infirm the value of prophylactic cholecystectomy must be balanced against the life expectancy and the added hazard of operation. Simple cholecystectomy is being accomplished with mortality rates of less than 1 per cent. In the presence of complications such as common duct stone or acute attack, distinct rises in surgical mortality rates may be anticipated.

Sparkman, R.: Clinical Significance of Quiescent Gallstones, Texas State J. Med. **46**:8-12 (*January*) 1950.

Tobacco Smoking vs. Bronchiogenic Carcinoma

Pathologists and clinicians have noted a striking increase in the incidence of bronchiogenic carcinoma in the past few years. The records of many of the larger hospitals show that cancer of the lung is now the most frequent visceral cancer in men.

Many writers have suggested that smoking, particularly cigaret smoking, may be an important factor in the production of bronchiogenic carcinoma. There is a remarkable similarity of the curve of increased sales of cigarets in this country to the greater prevalence of primary cancer of the lung.

Independent studies have produced data so uniform that the same conclusions may be derived from each of them. The principal conclusion is that excessive and prolonged use of tobacco, especially cigarets, seems to be an important factor in the incidence of bronchiogenic carcinoma. The occurrence of carcinoma of the lung in a male nonsmoker or minimal smoker is a rare phenomenon.

It is definitely stated that smoking is not the only etiologic factor. However, its importance is based on the following facts: (1) It is rare to find a case of epidermoid or undifferentiated carcinoma in a male patient who has not been at least a moderately heavy smoker for many years. (2) The use of cigarets is much greater among patients with cancer of the lungs than among other patients of the same age and economic groups. (3) The sex distribution of cancer of the lungs roughly corresponds to the ratio of long-term smoking habits of the two sexes. (4) The enormous increase in the sale of cigarets in this country approximately parallels the increase in bronchiogenic carcinoma.

The majority of patients with cancer of the lungs are cigaret smokers rather than pipe or cigar smokers, the ratio being over and above that found in the general population. Probably this is due to the following factors: (1) Cigaret smoke is more frequently inhaled than is that of either pipes or cigars. The lungs of an inhaler are exposed to a greater concentration of smoke than those of a person who does not consciously inhale. (2) Because of the greater physical and economic convenience, more persons are heavy smokers of cigarets than of either pipes or cigars. Among the latter one finds more minimal and light smokers than among the former. (3) Certain irritative substances may be present in greater amounts in cigarets than in pipes or cigars. The role of paper, the use of insecticides during the growth of the tobacco and other ingredients warrant further research in this respect.

Smoking habits have been classified into six groups: (1) Nonsmokers: fewer than 1 cigaret per day for more than twenty years. (2) Light smokers—from 1 to 9 cigarets per day for more than twenty years. (3) Moderately heavy smokers—from 10 to 15 cigarets per day for more than twenty years. (4) Heavy smokers—from 16 to 20 cigarets per day for more than twenty years. () Excessive smokers—from 21 to 34 cigarets per day for more than twenty years. (6) Chain smokers—35 or more cigarets per day for at least twenty years.

The relatively low incidence of the condition in women might be explained by the fact that few women in the cancer age have smoked for an excessive period.

These studies have been so well conducted that the results warrant serious attention.

Wynder, Ernest L., and Graham, Evarts A.: Tobacco Smoking as a

Possible Etiologic Factor in Bronchiogenic Carcinoma, J.A.M.A. **143**:329-336 (*May* 27) 1950.

Vitamin D in Children

The fact that children past infancy need vitamin D is often overlooked. A few children have sufficient utilization of calcium and phosphorus without additional vitamin D, but there is no simple way of recognizing such children. Therefore, it is appropriate for all children to have a vitamin D supplement.

The relative roles of vitamin D deficiency and mineral deficiency are not too clear. The intake of vitamin D will not compensate for a low calcium intake.

Between 300 to 400 units of vitamin D daily will provide satisfactory calcium and phosphorus retentions when the diet contains appropriate and recommended amounts of these minerals. During the prepubertal growth acceleration period and during adolescence the need for vitamin D is more universal than it is for younger children just past infancy. Also, during this period, there is a need for a greater intake of calcium.

With an intake of recommended amounts of calcium and phosphorus, 400 units of vitamin D permit proper retention of these minerals if the nutrition of the child is otherwise satisfactory.

Children who have had poor diets often fail to have satisfactory retention of calcium and phosphorus when first given a proper diet. After several months of a good diet, retentions gradually increase to the expected level without increase in vitamin D about 400 units daily.

Jeans, Philip C.: Vitamin D, J.A.M.A. **143**:177-181 (*May* 13) 1950.

Bromide Intoxication

The incidence of bromide intoxication is much greater than is realized. According to the Council on Pharmacy and Chemistry of the American Medical Association, 5 per cent of admissions to mental institutions are due to bromide intoxication.

It seems apparent that the average practitioner is not sufficiently aware of this fact. Studies reveal that bromidism is most frequently the result of taking medicine prescribed by the physician. And, too frequently, additional amounts of bromide are given in an effort to rid the patient of symptoms caused by bromides.

The unfortunate habit of self-medication with bromo-seltzer at the corner drug store in an effort to relieve a wide variety of complaints leads to dependence on the drug. There may be some question as to whether or not acetanilid, which is present in bromo-seltzer, is truly addicting but there is little doubt that it is habit forming.

In cases of severe poisoning the chief complaints are: (1) varying stages of drowsiness to coma, and (2) weakness, either generalized or localized. Less frequent signs are: (1) excitement, (2) dehydration, (3) reflex changes, (4) confusion, (5) rash, and (6) various aches and pains.

In poisoning from bromo-seltzer the acetanilid is entirely responsible for the methemoglobinemia and sulfhemoglobinemia with resultant cyanosis. Chronic poisoning with acetanilid results in emaciation, headache, and memory defects.

Bromidism produces a stupor and mental confusion which have a part in causing dehydration and increased susceptibility to infections. These conditions frequently lead to the presence of a dry, red, coated tongue and pharynx often associated with foul breath and nasal discharge sometimes accompanied by cough and thoracic signs.

It is wise for the dentist to bear in mind the oral symptoms. The red, dry, coated tongue and mucous membranes associated with nasal discharge and foul breath should alert the dentist to something unusual. Also the presence of a rash is indicative of bromidism.

The treatment of these patients is primarily with sodium chloride. The object is to replace the bromide ion with chloride as rapidly as the patient can tolerate. Gastric irritation is the limiting factor.

Extreme caution should be exercised in advising bromides. Practitioners are initially responsible for approximately 50 per cent of cases of excess bromide ingestion. Prescriptions for bromides should be nonrefillable. The practice of self-medication with bromo-seltzer should be condemned, particularly in view of its habit-forming properties.

Perkins, Herbert A.: Bromide Intoxication, Arch. Int. Med. **85**:783-794 (*May*) 1950.

Toxicity of Antibiotics

The main toxic reactions resulting from the administration of penicillin are those of sensitivity to the antibiotic or to its products. These consist of (1) drug fever, (2) urticaria, (3) asthma, (4) anaphylactic phenomena, (5) dermatitis, or (6) a combination of the signs and symptoms accompanying the reactions.

Previous fungal infections may sensitize an individual to penicillin. It is known that repeated courses of therapy increase the possibility of an allergic state being produced. The topical use of penicillin on certain mucous membranes and especially upon abraded or weeping surfaces is likely to produce sensitivity.

The inhalation of penicillin or its topical use in the oropharynx often produces direct irritative effects upon the tongue and mucous membranes of the nose and throat. At times, asthmatic states are induced by the inhalation of penicillin.

Reactions of sensitivity may occur within a few minutes after the administration or they may not make their appearance until days, weeks, or even months after treatment has been discontinued. Severe toxic reactions have occasionally been noted and some fatalities have been reported following the use of penicillin.

Streptomycin, like penicillin, often produces toxic reactions as a result of

(*Continued on page* 458)

(This quotation is taken from a recent letter)

"I have received my copy of Visual Education in Dentistry with my subscription to Dental Digest. I find that this book of charts affords a wonderful opportunity to explain dentistry to the patient, and I therefore am requesting another copy of Visual Education."

The above *voluntary* comment is typical of letters we receive almost every day. It typifies the manner in which *Visual Education In Dentistry* is received in countless thousands of dental offices. Its terse "wonderful opportunity to explain dentistry to the patient" is the chief reason for this series of 31 charts which is now in its tenth reprinting. And this practitioner's request for a second copy is the rule rather than the exception—one copy for use in the operatory and one copy for the reception room.

The present reprinting of *Visual Education In Dentistry* is identical with the previous edition with one exception—a new four-page two color chart entitled *THE DANGERS OF PYORRHEA AND POSSIBLE COMPLICATIONS.* It portrays possible complications in the blood stream which could stem from a pyorrhetic condition. Patients can readily assimilate this type of presentation. This is only one of the 31 charts in the complete booklet (see titles of the other 30 charts in the box on the left).

The chart *WHY CONSTRUCT A BRIDGE?* (see miniature reproduction on opposite page) is in constant use in dental offices everywhere. Many practitioners have it framed for easier use and preservation.

Twenty of the charts are printed in *full* color; 8 are printed in two colors. Only 3 are in black and white. All can be used effectively in educating the layman to understand the value of periodic dental care and the dangers of neglect. Isn't this an important problem in your practice?

The old bugaboo, fear of pain, is *slowly but surely* being overcome in the mind of the layman. And the regular use of the charts in *Visual Education In Dentistry* can help make this problem an easier one for you and the patient. The potential good will and better health cannot be overestimated.

The original edition of *Visual Education In Dentistry* contained only 12 charts and sold for $1.00 to regular subscribers and $2.00 to non-subscribers. The latest reprinting (31 charts) sells at the same prices despite terrific paper and printing increases over the years. We have always taken the attitude that the profit motive isn't the important factor in the dissemination of material of this highly ethical type.

Why not order one or more copies at this time? The coupon is for your convenience. All orders receive prompt attention. We refer non-subscribers to Dental Digest to the special combination subscription offer shown in the coupon.

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6. Modern Porcelain Restorations
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9. A Stitch in Time Saves Nine
10. When the Dentist Fills the Tooth
11. "Things Are Not Always What They Seem . . ."
12. The Development of Jaws and Teeth
13. Diseases of Teeth and Trees
14. The Collapsed Face
15. The Dangers from Pyorrhea
16. "Be Not the Last to Lay the Old Aside . . ."
17. The Foundation's the Thing
18. Insulation
19. "One Rotten Apple May Spoil a Bushel"
20. The Circulation of The Blood
21. Pyorrhea Treated or Neglected
22. The Action of Local Anesthesia
23. "A Little Neglect May Breed Mischief . . ."
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(*Continued from page* 454)

the development of sensitivity to the drug. These reactions may take the form (1) of a drug fever, (2) of varying types of dermatitis, or (3) they may resemble serum sickness.

It appears that streptomycin is more prone to produce sensitization of the skin than any of the other antibiotics. Because of this, persons who handle streptomycin frequently should protect themselves by wearing gloves and masks.

Another toxic reaction which may occur is vertigo or deafness or a combination of both. The vertigo is apparently produced by a toxic effect of the antibiotic upon the vestibular apparatus. There appears to be a direct relation between the occurrence of vertigo and the amount and period of time in which the drug is given. If the degree of vertigo is progressive the drug should be stopped.

Aureomycin has not produced any serious reactions to date other than nausea and vomiting and possibly a mild dermatitis. Patients who receive therapeutic doses of aureomycin frequently have several loose stools a day during the period of treatment. This is probably the result of a disturbance in the bacterial flora of the colon caused by the drug.

Tyrothricin and bacitracin have not produced any serious toxic reactions to date. There may be a slight irritation of the skin when topical applications are administered.

The antibiotics are finding an increasing range of usefulness in medicine and dentistry. They certainly are valuable allies in the treatment of many conditions and with a knowledge of their slight toxicity they can be even more valuable.

Long, Perrin: The Clinical Use of Antibiotics, M. Clin. North America **34**:307-318 (*March*) 1950.

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Soil, the Giver of Life

In the first week of July when the war began in Korea a group of scientists met in Chicago to discuss "Soil the Cradle of Life." It was the ninth annual institute on conservation, nutrition, and health sponsored by the Friends of the Land. The purpose of the Friends of the Land, in the words of Louis Bromfield, is "to make our citizens aware of our dwindling storehouses of resources, forest fires, pollution of streams, the extinction or depletion of our birds, game and fish, dust storms, drought, floods, exhausted lands. Our eyes can be trained to read these signs on the landscape and things to which we give our attention are the only things we see as we look at the landscape."

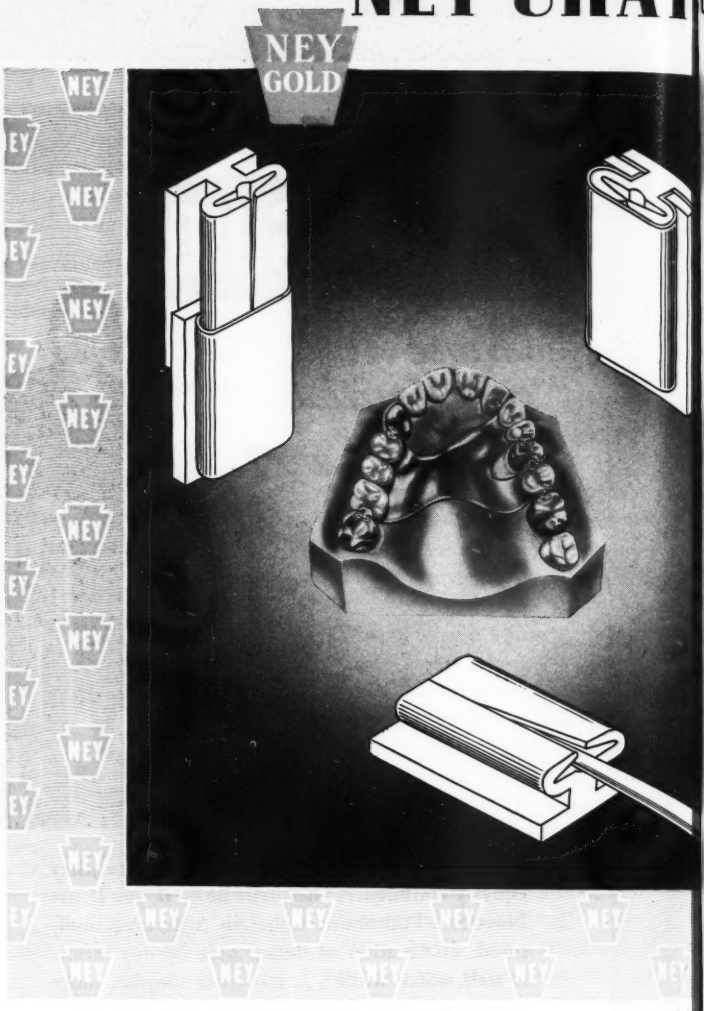
It was ironic that the meeting keynoting conservation should be held at the same time a war was beginning on the other side of the world. A war that would bring death and starvation to thousands of people. I came from the institute with the feeling that there is enough land available to supply the needs of all the people of the earth if the land is used wisely and productively and if the people are allowed to produce in peace rather than be destroyed in war.

It requires no superhuman intellect to realize that the human body is constantly changing and that what enters the body in the way of foodstuffs influences the finely adjusted chemical activities of the body. If the proper food is not supplied the human engine will function inefficiently and then not at all. Food is energy and energy is life. The animal and dairy products that we eat have their nutritive value from the plants upon which the animal feeds. The plants that we and animals eat have value from the character of the soil from which they grew. And the soil is teeming with life and energy. Our life springs from this cradle of the earth.

Whether our horizon is a citrus grove in California, an acreage of wheat upon the Kansas plain, a back yard garden in the city, or a mere potted plant on the windowsill, the drama of the soil must be constantly before us. Elizabeth McCoy, Professor of Agricultural Bacteriology of the University of Wisconsin, told this fascinating story before the institute:

"Without its microorganic life, soil would not be the dynamic, perpetual system that sustains all plants and in consequence all animals. The basic mineral structure of the soil, though important chemically and physically, is merely the habitat of the life of the soil. And of that life, the bacteria and their near relatives among the fungi are unquestionably the key of the biologic balance in the soil. It is trite, but true that the cycle of elements would run down, if it were not for the microorganisms.

NEY CHAY



Case photographs from "Movable-Removable Bridgework," McCall & Hugel, by special permission of the publishers.

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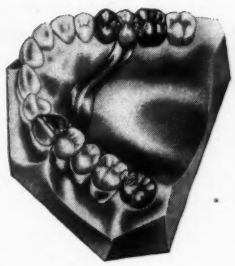

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"What comprises the microorganic life of the soil? It is conveniently described as microflora and microfauna, and consists of the following groups:

	Av. weight in lbs. per acre foot of soil
bacteria	500-1000
fungi (molds, etc.)	1500-2000
actinomycetes	800-1500
protozoa	200- 400
algae	200- 300
nematodes	25- 50
other worms and insects	800-1000

"Taken together, they amount to 3-5 tons per acre foot of soil, which is a considerable crop, comparable to plant or animal crops. Such figures are of interest but they still do not tell the story of relative importance. Average populations in a fertile soil are more indicative:

	Av. numbers per gm. of soil
bacteria	1,000,000,000
actinomycetes	10-20,000,000
fungi	1,000,000
protozoa	1,000,000
algae	100,000
nematodes	10-50

"Most of these microorganisms are found near the surface of the soil, usually within the upper 6 to 12 inches, and this stratification is a direct example of the ecological relations within the soil. Proper moisture, temperature, and aeration, as well as the greater concentration of organic matter as food, favor the microorganic population in the surface zone. Within the zone there may still be localization of types in a micro-ecological sense; in fact, there are many examples of particular populations of cellulose fermenters, pectin fermenters, urea fermenters, putrefactive bacteria, etc., springing up in conspicuous numbers in response to their specific food in the form of plant or animal residues.

"Consequently, whenever barnyard or green manure is plowed under on a field, there is an immediate surge of life. The easily decomposable organic matter, such as sugars, proteins, etc. are quickly attacked

They are the agents of decomposition of the organic matter tied up in plant or animal bodies. For their own purposes, the microorganisms take a small share of the necessary elements for growth of their own cells, but infinitely more important, they release for plants the major share of those elements from bound form in complex organic matter.

"Working upon the organic wastes excreted or upon the dead bodies of plants and animals, they hydrolyze and ferment and oxidize to obtain energy for their life processes. By working in relays, one type carrying on the decomposition when another leaves off, they eventually carry the decomposition to completion, i.e., they return the carbon to carbon dioxide, the nitrogen to ammonia and so to nitrate, the sulfer to sulfate, the phosphorus to phosphate. These are the nutrients for plants and they, in turn, are nutrients for animals. Thus the soil, because of the life within it becomes a great digestive system.

CLINICAL AND LABORATORY SUGGESTIONS

(*See pages* 448 *and* 449)

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and decomposed. The more resistant organic matter such as cellulose, lignin and waxes of plants and chitin of insect bodies and the like are slow to decompose. In fact, at any one time, there is an accumulation of partly decomposed resistant organic matter, to which we give the name of humus. It is the mass of partly decomposed organic residue of plant or animal or bacterial bodies, together with some compounds synthesized by the soil bacteria. It is not a stable compound or even mixture of compounds, because it is constantly undergoing slow further decomposition by soil microorganisms. Humus is dark brown in color and much of it is in colloidal state. There are several theories as to its biochemical formation. What may be called the humus-nucleus consists of ligno-proteinates combined with bases, with phosphates and silicates to form still other complexes. Thus humus also serves an important role in the base exchange in the soil.

"The amount of humus in soils varies widely. In water-logged soils, which are relatively anaerobic, humus accumulates to between 20 and 50 per cent of the dry weight of the soil. Such soils are low in fertility because their plant food is tied up in the organic form, waiting upon hydrolysis and oxidation to make it available. In loose-textured sandy soils the organic matter is rapidly and completely oxidized so that little humus accumulates. The ideal situation is the intermediate where there is a reserve of humus, in the range of 5 per cent, with conditions allowing the bacteria to convert it to plant food as needed. Thus humus is a key "compound" in soil, and proper soil management has as one of its chief objectives to encourage bacterial formation of humus."

Every day we dentists see the ravages of diseases that have their origins in the denatured and devitalized foods that people use. Along with the rampant caries, the devastating supporting tissue disease, the ridges that will not tolerate dental appliances, we come face to face with people who are nervous, who are easily fatigued, who lack zest, and who are

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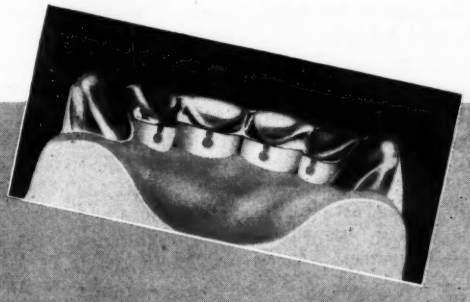

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In your ORAL HYGIENE this month

The Dentist on the First-Aid Team

Civil defense requires that in any local emergency dentists be prepared to serve on medical first-aid units. Doctor Walter Cronin, Director of Civil Defense in Cambridge, Massachusetts, has worked out a plan whereby the dentist receives necessary training to work with the physician and surgeon in caring for disaster victims. He points out that in any major catastrophe, many hospitals may be destroyed and many physicians killed. It will be necessary to call on dentists to augment medical units.

The National Security Resources Board sought Doctor Cronin's counsel when formulating plans for local defense throughout the nation. His plan may well form the pattern for your own community's civil defense.

★ ★ ★

"What Do Patients See From Your Chair?" . . . Before you answer, perhaps you'd better sit in that chair yourself. Charles P. FitzPatrick believes that the view may surprise you! He writes an interesting article—it won the monthly award—on office decoration and maintenance.

★ ★ ★

A secretary that never fails! . . . Doctor Carl V. Becherer has one—it's electronic. You will be surprised at the efficiency of this new device installed by a dentist whose time was divided between practice, dental school, and hospital.

Ever wished you could sleep a little longer in the morning? Ever wished for a nap at noon? . . . Doctor Millard D. Gibbs has arranged his practice so that efficiency takes the place of hurry, and economy permits shorter hours. First, he moved the office to his home—but read his complete story. It will have special interest for any dentist who, like Doctor Gibbs, finds his practice taking toll of his health.

★ ★ ★

Again Doctor David Tabak urges the profession to take action against the practice of illegal dentistry by dental mechanics. He feels that only by carefully defining and limiting the work of these technicians, can dentistry—and the public—be free of illegal practice.

★ ★ ★

It's rather a question whether Doctor Robert E. Motley is a dentist-artist or an artist-dentist—so far has he advanced in the field of painting! He's won honors and prizes with a hobby that might well have been his life work!

★ ★ ★

What's *your* service status? An article by Doctor Lester C. Hunt, U.S. Senator, explains the present program for making up the shortage of dental personnel which has existed since the recent war. About 2,000 more dentists will be needed.

plagued by aches and pains. Much of this ill health is traceable to nutritional disturbances. We must face the truth and admit that our practices are overwhelmingly concerned with curative and reparative procedures. And the physician is in the same sorry state. He writes prescriptions, injects drugs and antibiotics, and does surgical and mechanical procedures. Although dentists may have done a good job in impressing the public with the importance of periodic examinations and early treatment, our "prophylactic" procedures cannot be dignified without the quotation marks. Removing deposits and polishing the teeth have a very small measure of prophylactic value. Let's admit it among ourselves.

Who is to teach the rules of proper living? The dentist and the physician are too busy repairing disease. In fact, we never catch up with the work load. The teacher? She has her hands full now. The parent? The mother would have to be trained herself and she has no time or energy for such orientation except in a superficial manner. It looks, then, as if we need a new vocation, the health educator. Even if such a health educator were substantially trained and the school curriculum were to be altered to give her a chance to do such a sustaining health-teaching job from kindergarten through high school she would still be ineffective. The reason is not hard to uncover. The food processors, the adulterators, the devitalizers, the denaturers, are too strongly and richly entrenched. She could teach the great truths of healthful living in the classroom and see them violated and nullified as soon as the child stepped into the street or entered the home.

If the government were less concerned about corrective medical care and more concerned with creative and preventive medicine a strong beginning could be made. Nutritionists are reasonably well agreed on the minimum daily nutritional requirements and are equally well agreed on the harm that comes to health from the lifeless foods. For

far less than the cost of a compulsory health insurance system the government could tell people what foods they need to maintain health and what ones were harmful. The government could also exercise controls and subsidies to be sure that all families could secure and afford the proper foods and as a part of a program of control the government could protect citizens from the vendors of pernicious foods and the despoilers of the nation's health. That day will not likely come because the vested food interests are too powerful in the legislative lobbies and are too well supplied with money to use to influence opinion. Not until more people know more about the facts of nutrition and good living can we expect an improvement in the health of the nation.—E. J. R.

Anesthesia in Prolonged Dental Cases

(*Continued from page* 439)

is not suitable for open drop administration.

4. The odor is pleasant, not unlike that of chloroform, but less pungent.

5. An outstanding feature is its greater potency than chloroform.

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7. Trichlorethylene decomposes in strong sunlight to form toxic products and should, therefore, be stored in dark containers. However, trichlorethylene which has been standing in clear vaporizers for several days has been used without toxic effects being noted.

8. To retard decomposition, the British have added 0.01 per cent thymol and to distinguish it from chloroform, a waxoline blue dye is incorporated in the solution.

Contraindications

1. Trichlorethylene should never be used in any carbon dioxide absorption system because of its reaction with soda lime to form the toxic product dichloracetylene, which in turn, is easily oxidized to phosgene.

2. Tobacco smoke in the presence

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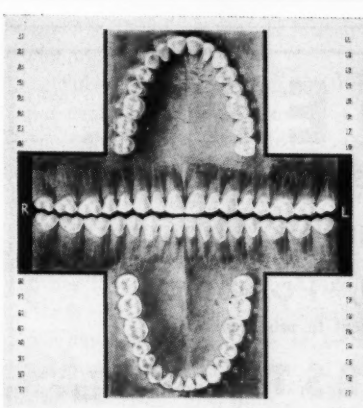

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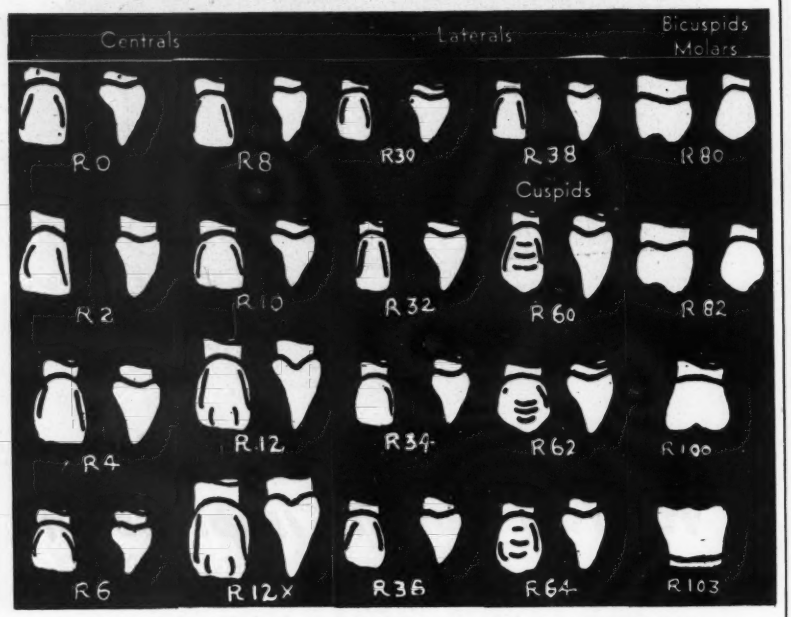

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of trilene administration may also result in the formation of phosgene.

3. The use of adrenalin (combined with procaine) is contraindicated, because of the tendency to produce ventricular fibrillation.

4. Trichlorethylene causes deterioration of rubber and such parts on machines should be checked regularly for leakage.

Clinical Results of Administration

1. Trilene has no irritant effect on the respiratory tract in human beings. This property is particularly important in unpremedicated cases.

2. Tachypnea is evident whenever too much of the agent is being administered.

3. Bradycardia, tachycardia, and cardiac irregularities have been noted only when the agent is pushed too vigorously.

4. Arrhythmias which may occur can be controlled by increasing the oxygen flow.

5. Extrasystoles are most common and are seen during the recovery period if too much of the drug has been given.

6. Acetonuria, probably resulting from transient alterations in liver function, seems to occur less often than with the use of ether but the presence of acetonuria preoperatively would possibly be a contraindication to the use of trilene.

Technique of Administration

Premedication—1. In the clinic the children are not premedicated. A barbiturate may be used with good effect but it has been found that premedication is unnecessary as trilene is nonirritating and dental extractions take little time.

2. Office patients are usually given a barbiturate one or one and a half hours prior to the appointment. This can be supplemented by a small dose of codeine and acetylsalicylic acid.

3. In the older age groups barbiturates definitely aid in producing smoother induction. Patients hospitalized for dental procedures are given premedication with morphine and scopolamine.

Induction—1. Induction in all patients is with nitrous oxide, 100 per cent, to render the patient unconscious. This is accomplished with the mask just off the patient's face, allowing the gas to flow over the nose and mouth. This form of induction aids materially in minimizing the child's apprehension.

2. As soon as the patient is unconscious and the mask is on the face, oxygen 20 per cent is quickly introduced with a small quantity of trilene. At no time are the patients allowed to become cyanotic.

Use of Mask—For cooperative patients the dental nasal mask is used from the beginning. For difficult patients, a bag and face mask are used at first and change is made to the nasal mask later.

Method—1. The expiratory valve of the nasal mask is open during induction and the patient's lips are held closed.

2. When the patient makes no response to instructions (1) the valve is closed, (2) the mouth is opened by gentle pressure on the lower teeth, (3) the gag inserted, and (4) the oral cavity quickly packed.

3. The valve is now partly opened again to reduce expiratory resistance and to prevent accumulation of carbon dioxide.

Small Amount of Anesthetic Used—1. Little trilene is required for maintenance. 2. Nitrous oxide is the main supportive agent. 3. Trilene is turned off toward the end of the operation and anesthesia is continued under nitrous oxide and whatever trilene remains in the blood stream.

Advantages of the Technique

1. Wide margins of safety are gained. With the addition of small amounts of trilene, such a pronounced degree of analgesia is created that the patient can be suitably controlled while an adequate percentage of oxygen is maintained in the inhaled atmosphere.

2. Incidence of postoperative nausea, vomiting, dizziness, or headache is extremely low.

3. Recovery is rapid, the patient becomes ambulatory in a few minutes.

4. Induction is pleasant and rapid.

5. Agents employed do not stimulate salivary secretions.

6. Economic factors are attractive.

Anesthesia for Dental Restorations

A technique devised by Doctor Digby Leigh for dental restoration cases in children involves the use of (1) sodium pentothal, (2) intocostrin or d-tubocurarine chloride, and (3) endotracheal nitrous oxide with oxygen. The patients are admitted to hospital the night before, examined physically, and have laboratory analyses.

Premedication—1. A barbiturate, usually nembutal, is given for a good night's rest.

2. In the morning, one hour preoperatively, premedication with morphine and scopolamine is prescribed according to the patient's weight and age. This produces a cooperative child with a dry operating field for the surgeon.

3. The technique of anesthesia is predicated on the fact that the patients return to their homes immediately after treatment.

Technique—For several years a combination of d-tubocurarine and sodium pentothal in one syringe has been used. Sixty to 80 units instead of 100 have been used which facilitates the administration of these drugs in small doses and produces a rapid, smooth induction. Often 250 milligrams of pentothal and 20 units of d-tubocurarine are all that is necessary for intubation.

Intubation—Under direct vision, intubation is either nasal or oral, and frequently by blind nasotracheal introduction.

1. Tubes are well lubricated with a 2 per cent nupercaine ointment in a water soluble base. This aids in obtunding laryngeal and pharyngeal reflexes.

2. The tube is connected with a partial rebreathing Foregger valve and bag through which nitrous oxide and oxygen (4:1 ratio) is delivered.

3. Controlled respiration is instituted immediately and maintained until the end of the operation.

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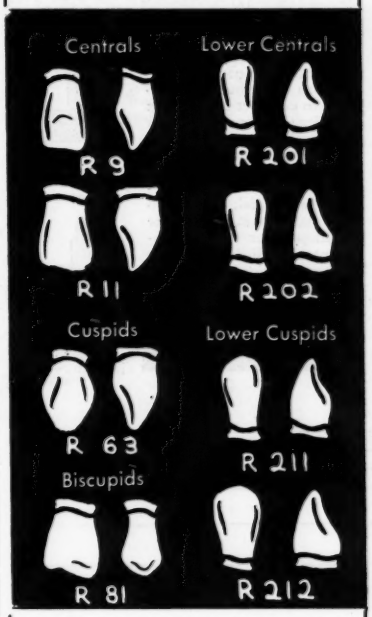

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fects of pentothal and curare wear off in twenty to thirty minutes, but no difficulty has been encountered in maintaining anesthesia as long as controlled breathing is continued.

2. Apnea is purposely created with the pentothal and curare and, presumably, the controlled respiration keeps the carbon dioxide level low enough to prevent stimulation of the respiratory center. In addition, the nitrogen in the alveolar blood is being washed out, thus providing a maximum concentration of nitrous oxide with 20 per cent oxygen where it is most efficacious.

3. Should the patient regain his own respiratory rhythm, all that is necessary to control him again is to compress the bag more rapidly until apnea is recreated.

Clinical Conditions—1. The pulse, under this technique, is slow. Both systolic and diastolic blood pressures drop 10 to 20 millimeters Hg.

2. Within seconds after stopping the controlled breathing, observations show an increased pulse and a return of blood pressure to normal.

3. The patient is "assisted" on return to normal breathing, but the tube is withdrawn before consciousness returns.

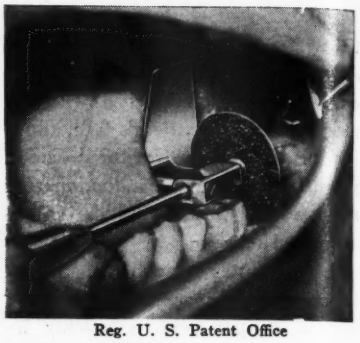
4. As a precaution, the hypopharynx and larynx are quickly examined with the aid of a laryngoscope in order to suction out any material which may have slipped past the oral gauze packing.

Indications

These children are soon awake with all reflexes present. They are able to take care of themselves for the next hour in the recovery room, following which they go home. The average time ranges from forty-five minutes to two and one-half hours.

Types of Treatment—Dental procedures included (1) dental restorations, sometimes involving up to 15 teeth, (2) full mouth extractions, (3) difficult extractions of roots, (4) resection of frenum, and (5) the making of plastic oral molds for prostheses.

Treatment of Adult Patients—Indications for this technique applied to adults in difficult cases requiring long procedure in the dentists's chair are the following: (1) poor risks requiring a maximum of oxygen and an unobstructed airway, (2) cases complicated by hemorrhage, and (3) cases where the operator requires an unobstructed field.



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Summary

A method of utilizing pentothal-curare-nitrous oxide and oxygen with controlled respirations is suggested for use in prolonged dental treatment and extractions in children.

From *Anesthesia and Analgesia* **28**:339-344 (November-December) 1949.

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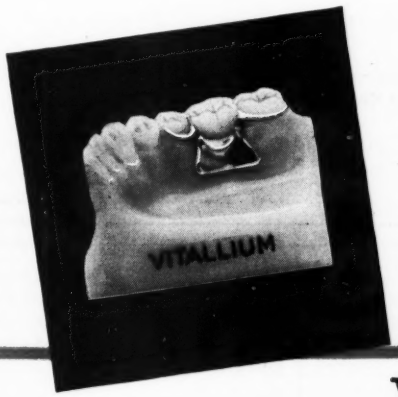

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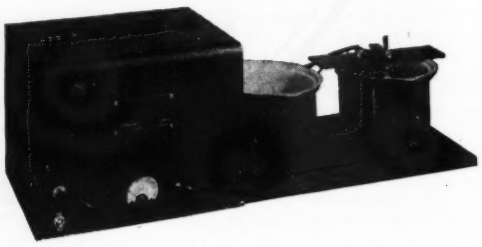

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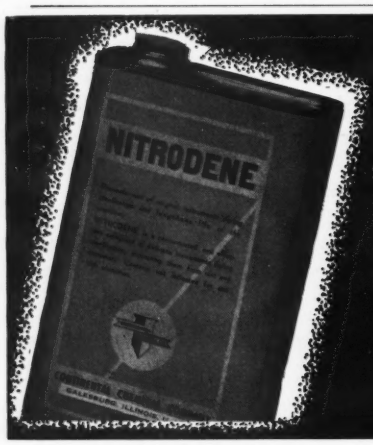

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